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Technical Education in the United States and Canada.

IN a recent article we commented in general terms on the importance of English manufacturers and, indeed, the entire community keeping themselves well acquainted with the movements, commercial and educational, of the United States. For, as we pointed out, the people of the United States are advancing in progress and prosperity, in keenness of competition, with remarkable rapidity. In Canada they are finding a great field for their efforts, much to the detriment of the British producer. It may, therefore, be interesting and useful if, leaving generalities somewhat, we present some concrete instances of the educational movement in the United States. It is the more easy to do this since in the course of last year a Report was made by the Director and Secretary of the Technical Instruction Committee of the City of Manchester of a visit of inspection made by him to the United States on behalf of that Committee.* The Report contains in a short space so much valuable information, so well put together, that it would be a national service if the Committee could arrange for its gratuitous distribution all over the country. But all we now propose to do is to utilise this information and present some portions of it to our readers.

We have in the United States, as the basis and starting point of all technical education, not only a first-rate system of primary education in the Free Schools of the country, but an enthusiasm for and an immense belief in the value of a general education as the foundation of all success in life. "Their schools are their pride and their delight, and you find this reflected in the high spirit and tone plainly evident in their pupils. . . . The school is honoured; it is placed, therefore, well in the eye of the public; its architecture is a matter of serious concern, which must itself be an object lesson. It is made bright with light and air, and externally beautiful with picture and statue." "The longer," said one experienced observer, "you keep a child at school in its infancy the more surely will he become an educated man." It is the educated man who, in the United States, is the successful man. On the exterior of the Boston Free Library is placed in striking letters the inscription: "The Commonwealth requires the education of the people as the safeguard of order and liberty." Here, then, is the first great advantage which at the present day America possesses over England. It has a first-rate universal system of primary education, and it regards that education as the most important outfit for material success. Here in England we are squabbling over voluntary and Board schools, begrudging money on them, talking over technical education, half-hearted believers in what on the other side of the Atlantic is the most potent influence in success.

Having thus a continuous supply of well-educated youths, it is easier to carry on technical schools. We will refer, by way of example, to the New York Trade School, which was founded in 1881. "The trades taught are those in which the hand, as distinguished from machinery, plays the chief part. They are what may be called domestic trades. They do not touch the question of foreign competition, or, if they do, it is in relation to labour, not to goods." Entrance is limited to young men between seventeen and twenty-two years of age. "The school owes its existence to the munificence of its founder (Colonel R. T. Auchmaty), who not only gave the land and the buildings, but left a large sum for its permanent endowment, and devoted much time to the perfection and elaboration of its system of instruction. Here, again, is a noticeable point—namely, the large sums of money which are devoted to education in America by such men. The millionaire is educating the people. The value of the school plant in this case exceeds 55,000*l.*, the annual cost of maintenance is 6,000*l.* The trades include electrical work, house, sign, and fresco painting, and the usual domestic trades. The rates for tuition vary from 2*l.* 10s. to 3*l.* 5s. for an evening course to 8*l.* for a day course, and these charges include the use of all tools and materials. The course most largely attended is that of plumbing. When this school was visited early last year 106 students were in attendance for a period of four months, from 8 a.m. to 4 p.m. In the evening there were eighty-one students in attendance for two and a half hours three times a week for six months. So highly are these plumbing classes regarded that they are being established all over the United States.

A very valuable and unique course is that for steam and hot-water fitting, including mechanical ventilation. All varieties and systems are practically taught as they are applied to different classes of buildings; and the demonstrations made, which are on full scale, were submitted to rigorous tests by being attached to the heating system in use in the school." And further on Mr. Reynolds writes:—

"I was fortunate in having the opportunity of seeing the impressive display of work done during the season of 1897-98. It was quite remarkable in extent—a room, for example, 100 ft. long by 35 ft. wide was entirely filled with very fine specimens of plumbers' work, amongst them a complete scheme, carried out on full scale, of the plumbing for a three-story house. The exhibits of other departments were on an equally imposing scale. In the carpentry room, for instance, there was shown a complete double-frame house, 15 ft. square by 20 ft. high, built by all the class, and in the sheet-metal room a beautiful metal canopy of fine architectural design, supported upon four pillars, which was 4 ft. square and 7 ft. in height. This exhibit will remain open every day, including Sundays, throughout the

* City of Manchester Technical Instruction Committee. Report of a visit to Technical Colleges, Institutions, Schools, Libraries, Museums, and Works in the United States and Canada. By J. H. Reynolds, Director and Secretary. Manchester: Henry Blacklock & Co., Limited.

summer, and certainly cannot be approached in extent and completeness by any other technical institution known to me."

Nearly 7,000 young men—the annual enrolment is about 500—have attended the New York Trade School since its foundation in 1881. They have come from nearly every State in the Union, from the Dominion of Canada and its contiguous colonies. Hundreds of young men, it is stated, have written to, or called at, the school to say that "the instruction of the school was the making of them." Most of them are getting high wages, and some are master mechanics.

We will now turn to another school of a wider kind—the Pratt Institute, Brooklyn. This, again, was founded by a private individual, Mr. Charles Pratt. The work of the Institute is fourfold:—"(1) Education pure and simple in the Manual Training High School. (2) Normal training in preparing a student to become a teacher (*a*) in the department of Fine Arts, (*b*) in the department of Domestic Art and Science, (*c*) in the department of Science and Technology, (*d*) in the department of the Kindergarten. (3) Technical or special training to secure practical skill and knowledge in the industrial and domestic arts. (4) Opportunities of acquiring a knowledge of and direction in special subjects relating to domestic, social, financial, and philanthropic interests." Nothing could be much wider than the training of this Institute, where 2,500 students every year receive instruction. Since its foundation in 1887 it has trained 25,528 students. And we would here call attention to the date of the beginning of this college. It shows, as do many others, how recent has been this educational movement. If so much has been done in the near past, what will the future bring forth? One point which will strike a reader of Mr. Reynolds's account of this Institute is, how clearly utility and beauty are kept in view. "The greatest importance," he writes, "is attached to the department of testing, applied to researches and observations on the strength of materials and on the applications of heat and electricity as a source and means of power." In contrast with this, we find that in the foundry and forge are hung "classical illustrations of the skill of the founder, in such notable masterpieces as Cellini's Perseus with the Gorgon's Head at Florence, or the bronze statue of the Colonna in the same city."

Not that the cultivation of art is left to photographs, but this one fact alone shows how carefully every means of improving the art faculty in the student is regarded. For again we read, "the artistic quality of the woodwork, which is admirably graded, is kept sedulously in view alike in respect of form and colour." When we read instance after instance of this catholicity of study, not only at this Pratt Institute, but at other equally important educational centres, such as the Drexel Institute at Philadelphia and the Lenn Institute at Chicago, it is impossible not to feel that the power of the United States, commercially and artistically, is yet only in its infancy. The effect of all this high technical and artistic training, not only on the character of the nation itself but upon the world at large, can yet hardly be realised. It is impossible not to perceive that such training must result in the manufacture of all sorts of articles which in utility and beauty will, as a rule, surpass those made in the Old World, unless the latter makes haste to take a lesson from beyond the Atlantic.

We will conclude with two extracts in reference to the Drexel Institute, each of them giving cause for reflection.

After describing the external character of the building, the author proceeds:—"The main entrance is formed by a lofty arch, 26 ft. wide by 32 ft. in height. The decoration of the arch is made specially interesting by the insertion of finely executed relief medallions of men famous in art, science, literature, and statesmanship. But the chief glory of the building is its great central court." This "is 65 ft. square. . . . . Arcaded galleries surround the court at the second and third floor level, and from these galleries open the various class-rooms, laboratories, and studios. . . . At the further end of the court marble staircases rise to the first floor story, with a marble stairway between them descending to the auditorium, seated for 1,500, and containing a fine organ. The court is lined and paved with coloured marbles and is decorated with fine examples of classic statues. . . . Surrounding the court are fine examples of paintings by famous artists." We are, in fact, describing a palace where the eye is pleased and the taste is cultivated. But "the courses in domestic science and art are arranged on an ample scale, with much thoroughness of equipment and organisation. In connexion therewith is a special museum of dress materials, whilst a temporary and very interesting exhibition was arranged, illustrating by the actual dresses the costumes worn in the first half of the century."

In other words, the most useful subjects are taught in buildings upon which no pains are spared from an artistic or a practical point of view, with the result that the present generation of Americans are receiving an education in science, in art, and in technical work which Englishmen have not yet attempted to realise, but which must have momentous consequences not only for the United States but for Europe.

ACETYLENE.

NOW that the excitement caused by the discovery of a method by which calcium carbide can be made at a comparatively low cost has subsided, and acetylene has found its legitimate field in the industrial world, a brief review of the lessons which have been learnt regarding the manufacture and use of this gas, and of the work to which it has already been successfully applied, may be of interest.

Nearly five years have elapsed since calcium carbide was first placed upon the market as an article of commerce, and during that period several hundred inventions relating to acetylene—most of them worthless and many of them dangerous—have been patented.

A great number of these inventions have died a natural death, but the fittest have survived, and there are now in existence several forms of acetylene generator which are exceedingly simple in construction, and which may safely be used by any person of ordinary intelligence. Unfortunately there are also others offered for sale which are by no means suitable for domestic use, and which naturally encourage public distrust of the brilliant illuminant.

When carbide was first introduced it appeared an extremely simple matter to generate rapidly acetylene in large quantities by merely allowing water to drop upon carbide contained in a suitable vessel. But it was soon found that with a considerable quantity of carbide and a fairly rapid flow of water the heat generated by the reaction, and largely retained by the residual lime, was so great that the gas obtained was inferior, both in quality and quantity, to that obtained when the carbide was decomposed under more favourable conditions. Then Professor Vivian B. Lewes undertook a thorough investigation of the whole subject, and discovered that, under certain conditions, the temperature of the decomposing carbide may rise above 800 deg. C., and that, when overheating does occur, the gas produced is not pure acetylene but a mixture of hydrogen, acetylene, and certain saturated hydro-carbons. He also pointed out that the colour of the waste lime produced by the reaction between the water and carbide affords an indication of the temperature under which the gas was produced. If, instead of being white or greyish white, the residue is found to be of a black or yellow colour, and to contain soot and tarry matter, then it is certain that overheating has occurred.

Instead of allowing water to fall upon the carbide, some inventors prefer to cause the water to rise from below and gradually surround the carbide; while others drop charges of carbide into a comparatively large volume of water. In each form it is possible for overheating to occur under certain circumstances. Expert writers on the subject usually give preference to the form of generator in which carbide in small charges is dropped into a large volume of water; there are, however, many disadvantages attendant upon this form of apparatus, the most serious of which is the difficulty of preventing any escape of gas when the carbide is thrown in; or, in the case of automatic generators, of obtaining a satisfactory distribution of carbide.

A large number of generators are intended to work automatically without the employment of the ordinary gasholder. We strongly advise, however, the rejection of any installation in which a holder of sufficient size to take the whole of the gas evolved from the full charge of carbide is not provided. The non-automatic generators, with their gasholders, usually occupy more ground than the automatic generators, but they are less liable to get out of order, and are, in our opinion, to be preferred to their automatic rivals. A large gasholder is, of course, an expensive item, but it is well worth the outlay.

Some forty factories in different parts of Europe and America are now engaged in the manufacture of carbide; and although England is not the country in which acetylene is likely to be most largely employed, it is already to be seen here in many country residences and in several railway stations and village streets. With carbide at its present price of about 20*l.* per ton, acetylene gas-lighting can only be profitably adopted in localities not yet supplied with coal-gas or where the price of coal-gas exceeds, say, 5s. per 1,000 cubic feet. But the low cost

of an acetylene installation and the small amount of labour entailed in its management as compared with a corresponding coal-gas plant renders acetylene very suitable for village illumination.

There is, however, one serious trouble connected with acetylene which has not yet been overcome, aud that is the blocking of gas-burner orifices with carbon. Acetylene is so rich in carbon that it is extremely difficult to prevent minute particles of free carbon, produced by decomposition of the gas, from accumulating in the burner orifices. Even the most successful burners yet introduced are rendered worthless from this cause in a few weeks, and until a satisfactory burner is discovered this trouble must greatly detract from the general utility of acetylene. Considerable improvement has, however, been made in acetylene burners so far as the light-emitting value of the gas is concerned. A short time ago the highest yield from the best burners on the market was equivalent to about thirty-two candles per cubic foot of acetylene, but some of the burners recently introduced yield a flame having an illuminating value of over forty candles per cubic foot of gas consumed per hour.

One purpose for which acetylene is very largely used, especially on the Continent, is as an enriching agent for compressed oil gas. A mixture of about 20 per cent. acetylene and 80 per cent. oil gas has the great advantage over pure oil gas that a light of given intensity can be obtained from the mixture with a much smaller consumption of gas. Hence, for the lighting of railway carrianges it is of great value, since a cylinder of the compressed mixture will serve for a greater number of hours than when compressed oil gas alone is employed.

In London acetylene has been most prominently brought to public notice by the cyclist, for the brilliant glare from the acetylene cycle-lamp at once attracts attention. These lamps appear to be very popular, but, although they may be serviceable to the cyclist, who sits behind the lamp, the light is so powerful that it is apt to embarrass the pedestrian suddenly brought within its compass.

Much has been written regarding the necessity for purifying the acetylene generated from commercial carbide, but we are inclined to think that the dangers of using the unpurified gas are somewhat overrated. The chief impurities are ammonia, sulphuretted hydrogen, and phosphoretted hydrogen, with a certain amount of water vapour expelled from the generator by the heat of the reaction and carried forward with the gas. Now, the first two impurities mentioned are very soluble in water, and it is a simple matter to separate the main portion of them from the acetylene by passing the gas through a suitable washer, and a suitable condenser should, of course, also be provided. But whether it is advisable to insist upon any further purification is extremely doubtful. Where the acetylene is distributed from a central station more complete purification may undoubtedly with advantage be carried out; but to advise the ordinary householder or householder's servant to purify his acetylene with chromic acid, bleaching powder, or copper chloride, is likely to lead to far worse disasters than any that can accrue from the presence of minute proportions of impurities in the acetylene.

As a summary of the present prospects of the acetylene industry it may be said, that acetylene is now being extensively used with perfect safety for both house and street illumination; that unless the price of carbide becomes materially reduced it is improbable that acetylene will exert any appreciable influence upon its rival illuminants; that much of the money which has been invested in acetylene inventions must necessarily be lost owing to the worthlessness of the apparatus "invented," but that the amount of sound and profitable business which is now being carried on indicates that the manufacture of calcium carbide will occupy a prominent position among the industries of the twentieth century.

NOTES.

London Smoke.

Sir W. Richmond's letter in the *Times* of Wednesday, under the heading "Coal Smoke Abatement," is a very practical one. He records what has been already accomplished by the society, called the "Coal Smoke Abatement Society," which he was instrumental in starting, by simply putting the existing law in operation in a number of cases; and he asks for four thousand subscribing members at 5s. annual subscription each, to give the Society an income of 1,000*l.* a year to continue its work. This ought to be feasible, and we hope the request will meet with an adequate response. There are two cautions we may give, suggested by the correspondence on the subject in daily papers. There are various people who persist in thinking that London smoke is the cause of London fog; an absolute illusion. Under certain circumstances it makes the fog worse than it otherwise would be. London fog arises, under certain conditions of the atmosphere and the earth, in the Thames Valley, and follows the course of that valley. More than once we have left Waterloo Station in a dense fog, which continued without intermission up to the point near Weybridge (quite out of reach of London smoke) where the line leaves the Thames Valley, when we ran into clear air in five minutes. The other matter is the foolish cry for the general compulsory use of anthracite coal to get rid of smoke. Have the people who write letters on this subject ever considered what is the proportion of anthracite coal attainable, and what would be the effect on its price of a universal demand for it?

Estimates by Builders.

A case which we report in another column shows how careful builders should be in entering into anything in the nature of a contract without much consideration. It is clear—we must ask the reader to refer to the case for the facts—that where a builder, in reply to an inquiry, says that his estimate to carry out certain work is so much, there is no contract. When, however, a building owner replies that he accepts the offer — then there is a completed contract, and the fact that the word "estimate" appears is no prevention of such completion. But when a builder desires to withdraw from a contract on the ground of having made a mistake in figures, a reasonable building owner should agree to such a course. What a building owner has a right to ask for is a fair tender, and he should not desire to get work done cheaply in consequence of a mistake.

Slum Landlords.

We have recently emphasised the point that the main thing to be aimed at in regard to "unhealthy areas" is to prevent them from becoming unhealthy—that prevention is better than cure. On Saturday last at Worship-street Police-court the Rev. W. Earle was summoned—but did not appear—for neglecting to remedy certain insanitary matters on his property in Alfred-place, Shoreditch. The sanitary inspector stated that on the premises complained of there were three families and no water-closet. The yard was "a lake of filth." The reverend gentleman was fined forty shillings and had to pay two guineas costs. This case well exemplifies what we have said from time to time. This property should never have been allowed to get to such a state. Why were not measures taken before? What, again, is the use of a fine of forty shillings? The punishment should be severe if there is to be any punishment at all. It is such owners as this who are receiving compensation from public monies when they ought not to get a penny, and when the bad state of the property should have been remedied long ago.

Offering Commissions to Architects.

In spite of all that has been said on the subject of tradesmen and manufacturers offering commissions to architects to use their goods, it seems impossible to get many of these firms to understand the impropriety and (when the offer is made to any respectable architect) the futility of this line of conduct. This week brings two of the most flagrant and barefaced attempts of this kind that we have seen. One is from an electrical engineering firm, and runs thus:—

"We observe you are the architect for" [naming a special building].

"Should they contemplate installing the electric light, and if you have the matter in hand, we shall be pleased to give you an estimate on hearing from you, at the same time reserving a commission of 5 per cent. for you."

This was sent to a well-known architect, who is an Associate of the Institute, and who forwarded it to us with an expression of the greatest indignation, and asks, "Is it not time that something was done to put a stop to this sort of thing?" We quite sympathise with him, but we do not know what can be done, except for every architect to boycott all firms sending him such proposals. The other document, also forwarded to us by a well-known architect, comes from a large iron-manufacturing firm, and is even more specific in its terms:—

"Sir,—We venture to approach you with reference to that department of our manufactures which comes directly in touch with architects and builders.

Being manufacturers on a very extensive scale, and patentees of some very well-known articles, we are naturally in a position to quote favourably.

It is our intention to allow architects a handsome commission on all specifications of our productions," &c.

Attached to the price list is a piece of paper gummed on, with the following words—"Private. Prices subject to 25 per cent. commission." This seems to us by far the more objectionable document of the two, because the tentative wording of the opening sentence, "We venture to approach you," implies that the writers were diffident as to the manner in which their overtures would

be received, and therefore were at all events aware that they were about a doubtful procedure. The idea seems to be to send round this kind of invitation in the hope that, though many who receive it will be indignant, some will be unprincipled enough to accept it. It would serve no purpose to give the names of the delinquents here—that would be advertising them; but we sent the papers to the Institute of Architects, in case the Council should be disposed to take any steps in the matter.

Concrete and Salt Water.

A RECENT article in the *Journal* of the Franklin Institute deals with the much disputed question as to whether salt placed in the gauging water to hinder freezing is really injurious, and also to determine whether or not the immersion of cement in sea water acts detrimentally on engineering structures. Unfortunately, the final tests were, for some reason, necessarily performed at the end of one year, instead of after the expiration of several years, as originally intended. Very little reliable knowledge is, therefore, gained as to the second object of inquiry, though the ill effects of salt appear to be demonstrated. Test briquettes were moulded in the manner recommended by the American Society of Civil Engineers, the material being rammed by a hammer machine, striking 120 blows on each briquette, with a 3-lb. hammer and a 10-in. drop. Mixing was performed in a machine, and standard consistency was adopted as far as possible. The briquettes were stored in moist air for twenty-four hours, and were then placed in tanks filled with fresh or salt water, and in these they remained until the time decided upon for testing arrived. Renewal of the water was practised as often as appeared necessary for the maintenance of its original condition and chemical constitution. Tension tests were first made upon briquettes by means of a Fairbank machine; the two parts were then held together by a rubber band, and subjected to compression tests on a Riehlé machine, actuated by hydraulic power. Specimen briquettes of each class were examined in this way after one week, four weeks, three months, six months, and twelve months. The results shown have all been tabulated and plotted diagrammatically for the purpose of ready reference. From an examination of these records, it appears that the briquettes mixed with salt water exhibited greater resistance than those in which fresh water was used, when the tests were made after the lapse of comparatively short intervals of time. Longer exposure, however, invariably resulted in demonstration of the superior strength of briquettes mixed with fresh water, and this observation extended both to compression and to tension tests. Curiously enough, the deteriorating effects of salt water in gauging appears to be greater on rich than on poor admixtures, and further, it is worthy of note that test pieces immersed in salt water are almost invariably injured to a greater extent than those subjected to the action of fresh water. The general conclusions to be drawn are (1) that salt water is prejudicial to cement mortar, (2) that the use of sea or salt water in gauging is undesirable. It would also appear that the effect of sea water on engineering structures gauged with fresh water is to produce weakness, but owing to limitation of the test period to one year, we do not feel justified in accepting this interpretation without reserve.

The Institution of Electrical Engineers.

DR. SILVANUS THOMPSON delivered his presidential address to the Institution of Electrical Engineers last week. He gave a *résumé* of the advances that are being made in the various branches of electrical engineering, and laid particular stress on the directions in which modern practice was tending. He expressed himself with great boldness, and, although his views on many subjects were diametrically opposed to the opinions and practice of many members, yet his eloquence, combined with a happy knack he has of stating unpalatable truths pleasantly, secured the unanimous applause of the crowded audience. We agree with him in thinking that the problem of the present hour is: what surface contact system of electric traction suitable for busy thoroughfares shall we adopt? In New York, Berlin, and Paris successful systems without overhead wires have been at work for years. In Paris they will soon have forty-six miles of a surface contact tramway, so there can be no doubt that such systems are feasible and financially successful. In this country the total capital of all the electric traction companies (20,800,000*l.*) already exceeds the capital of all the electric supply companies and it will soon be enormously increased. Dr. Thompson thought it a great pity that there were no organisations in this country like the industrial banks of Germany, which are always ready to assist the deserving inventor. As it is now, he must either raise money amongst his friends, and have a purely private venture, or put it in the hands of a company promoter, who will probably bring out an "over-capitalised swindle." The whole question is in a very unsatisfactory state, and is little less than a public scandal. Dr. Thompson expressed his astonishment that the District and Metropolitan Railways should have thought it necessary to experiment on electric traction, seeing the numerous electric railways there are working successfully. He thought there could be no question that the proper system was an alternating current one, with three phase motors. To Switzerland rather than to America we must look for the best models. It is unfortunately true that much money is being spent in this country not to the best advantage, because many of the schemes being adopted are on much too small a scale.

The New Water-Gas Process.

THE process for the manufacture of water-gas patented by Carl Dellwik in 1896, and subsequently improved by Dr. Fleischer, is apparently destined to revolutionise the present methods of fuel-gas manufacture. Professor Vivian B. Lewes when introducing the process to the notice of the Gas Institute stated that he had himself examined the plant erected in Westphalia, and quoted results which he had seen obtained and which he said would sound to many like a "fairy tale." Dr. Lunge in his recent Hurter memorial lecture stated that he also has examined the plant and obtained similar figures to those recorded by Professor Lewes. He found that the yield of gas from a given weight of coke was fully double that hitherto obtained from the best water-gas installations. Moreover, in the old processes ten minutes were expended in "blowing up" the coke to the requisite temperature for every five minutes expended in manufacturing water-gas; whereas in the new process less than two minutes are required for "blowing up" for every eight to ten minutes expended in gas-making. The composition of the water-gas is the same in both cases. Dr. Lunge ascribes the remarkable results to the employment of a higher pressure air-blast rather than to the comparatively slight difference in the form of the gas-producer.

Siding Rent on Railways.

SINCE the passing of the Acts of Parliament restricting the railway companies' charging powers for conveyance and terminals, it would appear that they have been giving more attention than formerly to other sources of revenue, such as cartage, demurrage, siding rent, &c. But while they enjoy a certain amount of latitude with regard to such charges as those mentioned, it is always open to traders to obtain arbitration upon points where the "reasonableness" of a charge or practice is open to question. A case of this nature occupied the attention of the Railway and Canal Commissioners—sitting as arbitrators—last week, judgment being given decidedly in favour of the railway companies, by Mr. Justice Wright last Saturday. This decision affirms the reasonableness of the charge of 6d. per wagon per day for siding rent after four clear days have been allowed for unloading; with a proviso that any special circumstances may be taken into consideration—as in cases where traffic is delivered irregularly, to the trader's inconvenience. The latter were, however, very desirous of obtaining a pronouncement in favour of reverting to a method of averaging, under which time saved by a prompt discharge was formerly set off against detentions. The decision of the Commissioners will be especially disappointing to the coal traders, who are chiefly affected, but it should be noted by builders and contractors too. It is a matter which has been before the Courts several times in different forms, and there are probably large sums involved, as the outstanding disputes date back to 1895.

The City Green-yard, Cripplegate Without.

WE learn that the Lord Mayor's stables (erected about 1775) are about to be rebuilt. The project has been in contemplation during many years past. The stables form the east side of the City Green-yard, whose entrance is exactly opposite the site of the door of the old debtors' prison in Whitecross-street, erected in 1813-15 after the designs of William Montague, City architect, where now stands the Midland Railway receiving-office. In the central block of the stables is housed the Lord Mayor's state-coach, which, according to the Report of the Municipal Corporations Commissioners, was built in 1757, and Cipriani, reputedly, painted the seven panels—the heraldical paintings being by Catton.* The City Green (or Corporation) yard was established as a pound for the detention of horses found astray, or unfit for work, in the streets—a board with a scale of charges is fixed on the

*In his "Nollekens and his Times" Smith says that in 1762 the King's state-coach was purchased by the Corporation, who employed Dance to repaint the panels.

wall. Above the former entrance was inserted a stone, inscribed "THE CITY GREEN-YARD, 1771." In August, 1893, the materials of a portion of the yard, including the gateway, the vacated almshouses, and some cottages, were sold for the erection (at a cost of about 6,300*l.*) of some stabling for the City Police, with the gas examiner's and gas-meter testing offices. The last-named offices, on the right hand, occupy the site of the almshouses for eight poor men, endowed by Sir Thomas Gresham with 53*l.* 6s. 8d. annually out of the rents of the Royal Exchange, which he devised to the Corporation and the Mercers' Company, and formerly at Gresham College. On the demolition of the college in 1768 the almshouses were rebuilt (1774) in two blocks, with a high blank wall at the end, in the Green-yard; new quarters for the inmates were erected at Brixton about thirteen years ago.

The Society of Designers.

ON Tuesday evening, at Clifford's Inn, Mr. Richard Lunn, lately a director of the Crown Derby Porcelain Company, delivered a lecture on "Design for Pottery" before this Society. Very few people know much about the useful potter's art, and Mr. Lunn had some very excellent lessons to point out to the British public and to the rising generation of designers. To the latter he insisted that, in spite of the alteration of conditions, if the aim be right, good results will follow. To the former he lays the blame of seriously damaging the art of pottery. The rage for white ware has nearly destroyed it; chemical science has produced a whiteness with none of the quality or body of the ancient white. No scheme of decoration can harmonise with this unless it is the white tablecloth (which Mr. Lunn might have condemned at the same time). Naturally, the conditions under which potters work have changed since the days of Darius I. B.C., or the ancient Greeks; the more serious change is, however, of recent years. Della Robbia, Bristol, Wedgwood, worked for the wealthy few. To-day, the potter works for the million. The old potters knew the limits of their work, simplicity of form, harmony, and richness of colour. Their pleasure was to give a beauty and variety to common things. They spared no pains to turn an earth pot into a work of art. They were not bewildered by the soulless repetition of their labour or cheap imitations from Germany. They kept clear of the many rules and catchwords that hamper the movements of the modern worker. Naturally feeling the design, and being in earnest, they found their own way of expressing their feeling and individuality.

Paint Tests.

IN pursuance of instructions from the Bureau of Surveys of the Public Works Department of Philadelphia, various tests of paint have lately been made. The last annual report of Mr. Webster, M.Am.Soc.C.E., Chief Engineer to the Bureau, mentions the fact that fifty-four pieces of steel plate have been treated with as many different kinds of paint. Some of the latter were specially made for the protection of metal from fumes given out by locomotives, and were exposed on the under side of a bridge about 16 ft. above the rails. Examination was made at certain intervals, and the recorded results include classification according to the conditions under which the tests were conducted. The information obtained is no doubt useful so far as it extends, though it does not appear to suggest departure from practice at present adopted in Philadelphia of protecting metal work by the application of red-lead with a medium of pure linseed oil. Tests on a larger scale are now to be made, and we learn that six spans of the Grays Ferry Bridge are each to be covered with a different paint, so that durability and other qualities in actual service may be observed. Some of the spans in question are over railway tracks, and the others will only be exposed to climatic influences. It seems rather difficult to arrive at comparable results when the conditions are so divergent, and we think finality would be more readily attained if a different method were adopted. One practical issue of the experiments already made has been to further establish the necessity for the prevention of rust before the application of the paint. This is a point of great importance in all operations of the kind, and is one to which we directed attention only a few weeks ago.

Electric Lighting in the Isle of Man.

THE Isle of Man Tramways Company offered recently to supply the Douglas Corporation with electricity in bulk at a cost of 3d. to 3½d. per unit. The Corporation were apparently invited to lay mains and get consumers, and then become purveyors of electricity. They sent the Tramway Company's proposal to Dr. Fleming, who had previously advised them to take up electric supply, and asked him for his opinion. His Report, which has recently been published, is interesting reading, and touches on various topics of 'general interest. He points out that the Tramway Company offer to supply the power at a pressure of 460 volts, and this would mean, on the three-wire system, a pressure of 230 volts at the consumers' terminals. Although several companies are supplying at this pressure, and some of the stations designed by Professor Kennedy are using it, yet we agree with Dr. Fleming that it has many drawbacks. Lamps of less than 16 candle-power are very unsatisfactory at 230 volts. Now, all those corporations which have made their electric lighting a success have done so by making it the poor man's light and not merely the light of the well-to-do. The small consumer, with his 5 or 8 candle-power lamps, which he is always using, is a far more profitable client than the rich shopkeeper who closes earlier. The only way to attract this desirable client is to let him use small lamps and to introduce a sliding scale for his benefit. Buying electricity at 3d. a unit would, of course, preclude ever lowering the price to any appreciable extent. If the Douglas Corporation had accepted the Tramway Company's offer an interesting experiment would have been made. There are many cases of corporations regularly supplying electricity in bulk to companies, but the converse of this process is unknown. A corporation which undertook a middleman's duties merely would be soon placed in an unenviable position.

M. Latoix' Exhibition.

"ENGLISH PASTORALS," by Mr. Gaspard Latoix, on view at Messrs. Dowdeswell's Gallery, are painted in a very un-English style, though they are not necessarily the worse for that. The artist's manner is very broad, and he has some fine forcible effects of light and colour, and some which are forcible without being fine, such as "Tadley Hill," which rather suggests a piece of worsted-work than a painting. "The Edge of the Forest," "The Lock at Woolhampton," and "Silchester Common," are among the best things in the collection; they are powerful landscapes, but the crude dry character of the handling of the tree foliage, in "Woolhampton Lock" especially, is not agreeable, and the greens are harsh. The painter seems to have a feeling for the sentiment of landscape, with a deficient sense of colour.

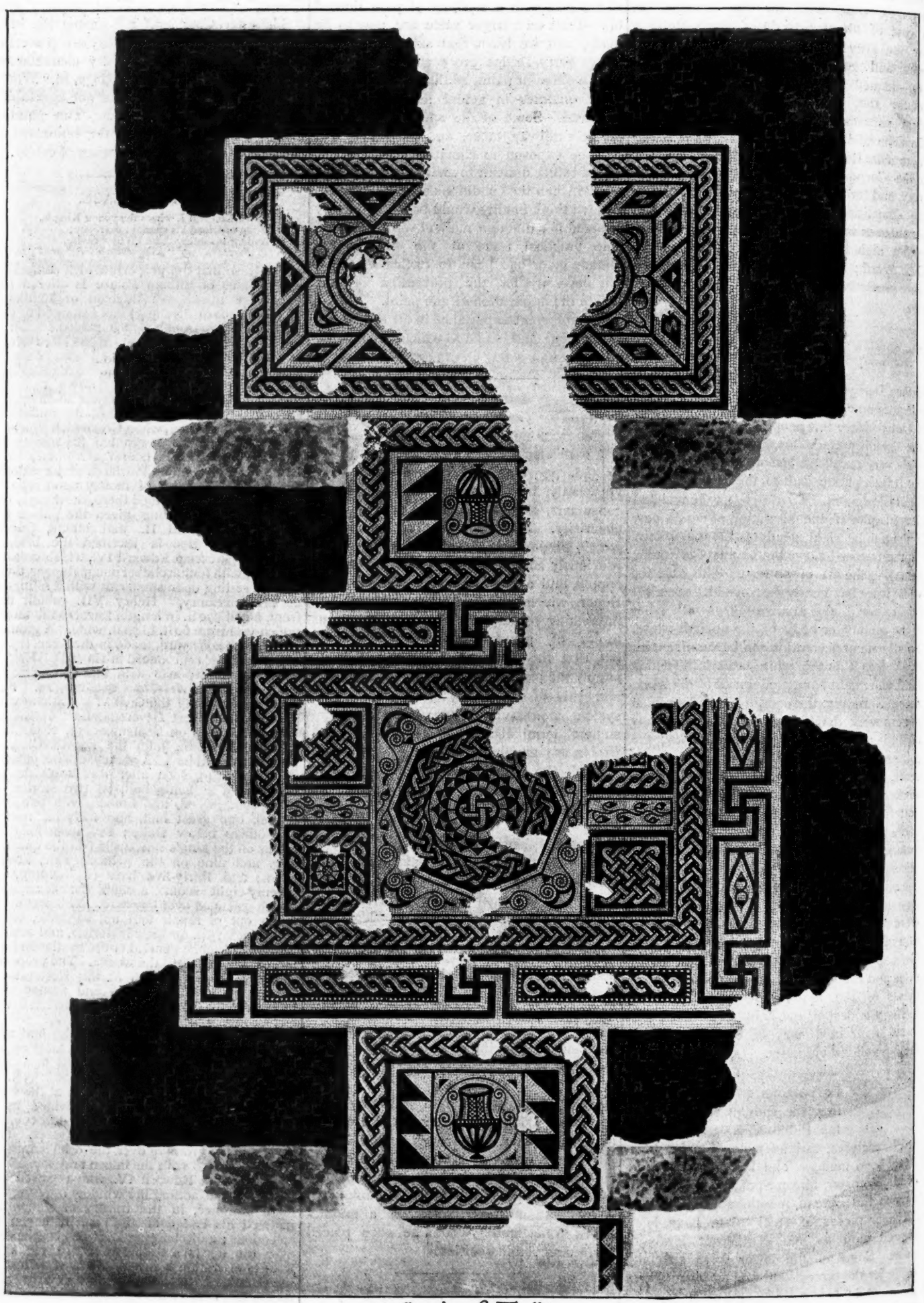
ELTHAM PALACE.

To Eltham will I, where the young King is,
Being ordained his special governour;
And for his safety there I'll best devise.
First Part of "King Henry VI.," act i., sc. 1.

WE learn that the property which comprises the remains of Eltham Palace is offered for sale. The manor of Aldeham or Ealdham (the old place or dwelling) had belonged to the royal demesnes from a remote period; according to one account it belonged to Odo, Bishop of Bayeux, *temp.* William I., from whom it passed into the hands jointly of the Mandevilles and the Crown, whilst it is known to have formed a favourite resort of our Plantagenet kings and their successors until the middle of the sixteenth century, when Greenwich usurped its place. Edward I. granted his moiety to John de Vesci, and in his reign Anthony Bec, Bishop of Durham and Patriarch of Jerusalem, expended large sums of money upon repairs of the structure. He died there, Stow says, on March 28, 1311, having given the palace to, some say, Edward II., and others, Queen Isabella. To Bec is ascribed the bridge, rebuilt in part *temp.* Edward IV., which crosses the moat with four arches of unequal spans, their crowns resting upon stone ribs with a filling-in of brick-masonry. Henry VII. rebuilt the front, about 370 ft. in length, towards the moat, which was from 60 ft. to 70 ft. wide. A ground plan of the courtyard, made in the year (1509) of his death, is reproduced in Hasted's "Kent." The plan corresponds with that of Bodiham, the hall lying between two quadrangles. For some while during the Civil War Eltham was occupied by Robert Devereux, Earl of Essex, who died there on September 13, 1646, and was buried in St. John the Baptist Chapel, Westminster Abbey. A survey of the palace, taken in 1649, soon after the king's death, describes it as being built in two stories, of brick, stone, wood, and timber, with one fair chapel, one great hall, and forty-six rooms and offices below stairs; seventeen lodging rooms on the king's side, twelve on the queen's side, and nine on the prince's side, above stairs; and thirty-five bays of building, or seventy-eight rooms around the courtyard, which extended over one acre. The premises, much out of repair and untenantable, were valued at 2,754*l.* for their materials, and sold to Nathaniel Rich, a general of the Parliamentary forces, who felled all the woods. The property returned to the Crown at the Restoration, when a lease of the house and manor was granted to Sir John Shaw, who converted the former into a farmhouse.

The chief glory of Eltham are the hall and its roof, of which at this juncture a brief notice may not be out of place. The hall measures within, 101 ft. 3 in. by 36 ft. 3 in., and 55 ft. in height.* It is lighted by two bays at the west end, and side windows (each divided by a mullion without a transom) arranged in couples in five spaces separated by buttresses. The bosses of the groining over the oriel windows are ornamented with the falcon and fetterlock, cognisances of Edward IV., who repaired the fabric in 1480, adding the window opposite the main entrance, in the tracery of which he inserted his badge of the rose in a sun in splendour; a discharging arch was constructed over the north-east doorway. In 1782 the Society of Antiquaries published a drawing of the screen, above which were the remains of a rude framework of wood, supposed by some to have been a gallery. The design of the early fifteenth century hammer-beam roof—remarkable for the beauty of its workmanship and

* "Plans, Elevations, Sections, Details, and Views of the Great Hall, of the Royal Palace of Eltham in Kent, by H. Dunnage and C. Laver, architects." 1828: 4°.



Roman Pavement recently discovered at Dorchester. From a Measured Drawing by Messrs. Jennings & Goater, architects.

goodness of material—is very similar to that of Westminster Hall, though less steep and built without the great rib. J. C. Buckler, in some notes made by him in 1810, says the roof is made of chestnut wood, and that he found the principal wall-plate (since decayed), of 11 in. by 20 in. section, rabbeted into the cornice of which it forms a part, and which is further secured by wedges, 12 in. by 8 in., and 1½ in. thick, forming together the bold and handsome cluster of mouldings crowning the wall on each side; the two plates he describes as being wedged and pinned together, whilst in some repairs the beams had been partly cut away and the space supplied with brickwork carrying the new rafter plate which was fixed 13 in. above the level of the old one; the main beams are 17 in. square, and 28 ft. long. In 1828 Smirke repaired the hall which Wyattville wanted to pull down for the sake of its roof; the hall of late years was used as a barn, but has since been better cared for. In 1834 Dr. David King and A. B. Clayton, architect, discovered and explored a series of underground passages, for the greater part vaulted in brick, with decoys, stairs, and shafts, entered from a room in the court and passing under the moat, the longest passage extending 500 ft. westwards, in the direction of Middle Park; in their descriptive pamphlet will be found Clayton's drawing of the entrance, in section, into the underground room, 10 ft. by 5 ft., leading to the passages. Of the many views of the palace we may cite those by Stent (1650), in Lysons (1796), by Buck (one showing the gateway entire), and an old drawing in the King's Library, British Museum.

In 1364, Edward III. gave a magnificent entertainment to King John of France at Eltham, and there were born Edward II.'s son John, Earl of Cornwall, and Edward IV.'s daughter Bridget, who took the veil at Dartford. Lord Cobham succeeded Sir Christopher Hatton as keeper; Stow mentions in his "Annals" several of our kings, from Henry III. to Henry VIII., who "kept Christmas" in sumptuous style at Eltham.

ROMAN PAVEMENT, DORCHESTER.

THIS pavement, as our readers may remember, was discovered in August last at Dorchester while excavating for the drains of some houses belonging to Mr. A. C. Higgs, of Weymouth. It lies about 2 ft. below the surface which for centuries has been farm land, so the plough must many times have passed within a few inches of the tiles. Several human skeletons have been found in the immediate vicinity embedded in the chalk.

The centre of the pavement has sunk about 4 in. below the remainder, probably owing to a hypocaust or other cavity below. The general plan of ornamentation is a most uncommon one, and consists of ½-in. cubes in white, black, red, and blue or grey tesseræ; the white is marble, the black is thought to be the same, but it scrapes into a brownish dust and is more suggestive of Kimmeridge shale; the blue is of a slaty nature, and the red is brick, the whole lying on a foundation of 3 in. of concrete, now in a crumbling state. The remains apparently date from the sixth century, and a subscription is on foot to purchase them for the local museum.

A very small separate bit of pavement was in existence to the south of the main portion given here, and was shown on the drawing, but we have not included it in our reproduction, as it would have been necessary to reduce the size of the drawing very much (besides leaving a great deal of white space) to get it in position on the page.

The illustration is reproduced from an excellent measured and coloured drawing made by Messrs. Jennings & Goater, architects, of Bournemouth, to whom we are indebted for their kind permission to make use of it.

THE ABERDEEN CORPORATION BILL.—On the 16th inst., a number of local architects and builders met the Town Council's Special Committee on the new Corporation Bill for conference as to the proposed clauses affecting the construction of buildings. The Aberdeen Architects' Association was represented by Mr. R. G. Wilson, architect, and the Builders' Association by Mr. John Morgan. The various sections of the Bill were considered in detail, and it was ultimately agreed that the architects and builders in the city should submit in writing their views as to desirable amendments of the clauses relating to width of streets and the height and construction of new buildings.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

A MEETING of the Royal Institute of British Architects was held on Monday, at No. 9, Conduit-street, Regent-street, W., Mr. William Emerson, President, in the chair.

The Late Sir Thomas Deane and Mr. T. J. Flockton.

Mr. Alexander Graham, the Hon. Secretary, said he was sure every one present, and every member of their calling, regretted the announcement he had to make of the decease of a distinguished colleague—Sir Thomas Deane, of Dublin. His name was familiar to them and those of the former generation as a man of very high distinction, who did excellent work not only in Dublin, but also in Oxford, and, he might add, in London. The late Sir Thomas was not a member of the Institute, but he was a member of the Institute of Ireland which was allied to the Royal Institute. He was also a member of the Royal Hibernian Academy. His principal work was the Library and Museum at Dublin, for which her Majesty the Queen conferred upon him the honour of Knighthood. There were other works probably well known to those present. Amongst the most conspicuous was the Library and Museum at Oxford, which was not only known as good architecture, but as one of those great works which came under the influence of Ruskin's teaching and exemplified in many ways the power that Ruskin exercised for a long period over architects of experience like Sir Thomas Deane. The deceased was also one of the competitors for the Law Courts, and many of them remembered the beautiful design he prepared in conjunction with his partner, Mr. Woodward. The late Sir Thomas was also one of the competitors for the Imperial Institute, and many would also remember the design he submitted.

Mr. Graham said he was also sorry to say that they had sustained a loss by the decease of Mr. Flockton, of Sheffield, who had had a long career and had carried out a great deal of work. In fact, the late Mr. Flockton was almost an embodiment of Sheffield. He built one-half of the town; wherever they went in Sheffield they found his work. One special work to which attention might be called was the Art Gallery (designed in conjunction with Mr. Gibbs), a very fine building. It was proposed to insert in the *Journal* a short memoir of the career of both Sir Thomas Deane and Mr. Flockton, together with a list of their works.*

Excavations in Cyprus in 1896.

Dr. A. S. Murray then read a paper on "Excavations in Cyprus in 1896":—

He opened with a description of the site of the excavations. The district is best known to classical students from the extensive ruins of the Græco-Roman city of Salamis which lie along the seashore. It had been thought that the lower strata contained remains of a much older settlement, which would confirm the tradition that a band of Greeks returning from the war of Troy had settled there and built a city, naming it after their native island of Salamis. But no such remains were found. More inland, however, were several underground tombs, of construction peculiar to the Mycenæan age—such remains as might be expected of the orginal Greek colonists. As the settlers would have kept to the coast, the present inland situation of the remains was explained by the fact that an extensive tract of marshy land, through which the river Pediæos flows, had once been a fine bay, at the head of which, on a rocky slope, the Greek colony was established. Between this slope and the river, when Dr. Murray's party arrived, was a stretch of tilled fields, worked by the people of a neighbouring village. On the face of the fields there was no sign whatever of ancient civilisation. An accident led to important discoveries. An ox in ploughing put its foot into a hole. At night the ploughman returned to the spot and found underneath a fine tomb of the Mycenæan period. The secret leaking out, Dr. Murray, who was just then starting for Cyprus, decided on further investigation, which resulted in the discovery of about 100 tombs, all of the Mycenæan age. This they claimed to be the burying-ground of the original Greek settlers. Traces existed of previous rifling of the tombs in Roman and mediæval days. Notwithstanding this, the objects in gold discovered almost equalled in quantity those obtained by Dr. Schliemann at Mycenæ, and were fully as important in quality; while the ivory carvings were of far greater value than his, and the pottery more abundant and of greater interest. The author dated them at about 800 B.C., or even a century earlier. Numerous objects were found which had been imported directly from Egypt, others from Phœnicia exhibiting the mixture of Egyptian and Assyrian art for which the Phœnicians were famous, and others in which a purely Hellenic spirit was recognised, sometimes acting upon and modifying Oriental conceptions; at other times introducing entirely new conceptions as well as new technical resources. In the author's view this new Hellenic element had reached Cyprus from the adjacent coast of Asia Minor, whence came the earliest Greek poetry, the earliest philosophy, the earliest painting. One of two reliefs on an ivory mirror handle represented a man slaying a gryphon—a familiar subject in Phœnician works, particularly among the antiquities found by Layard at Nineveh, dating about 800 B.C. The conception was obviously Assyrian in its origin, but there was also a breadth and style in the gryphon, and a keen sense of the creature's suffering, which was finer in observation than anything known in Assyrian or Egyptian art. The other relief was a lion attacking a bull—again a frequent conception in Phœnician art. But in no case was the conception worked out in the ingenious manner here displayed. The artistic power and the just observation of animal life exhibited in these reliefs were premonitory of Greek genius. An ivory casket was another example. Its lid was divided into squares for the game of draughts on the same principle as an Egyptian draught-board, but the art of the reliefs on the sides was not Egyptian. It corresponded to what is known as Hittite art, the remains of which are found in Northern Asia and in Asia Minor. The prevailing element of the subject depicted was Assyrian, but on to that was engrafted a certain rude observation of actual men and animals, unlike anything Assyrian. The dawn of a true Greek artistic spirit was also exhibited in some porcelain drinking vessels. One or two were prototypes of similar Greek vases of the sixth century B.C. Among the bronzes found were a pair of finely-made greaves. As bronze greaves were not known in Homer's time, these antiquities were consequently later than the Homeric poems. A curious cubical bronze stand, showing on each of its four sides the heads of two women looking out of a window, seemed to be characteristically Palestinian, and might be taken as an illustration of the bronze stands or bases which Hiram made for King Solomon. On one part of the site were found bronze utensils, shovels, tongs, field implements, the pans of a balance, and some bronze vases which had been crushed together as if ready for melting. A heavy ingot of bronze, such as was exported for melting purposes, pointed to these being the remains of a foundry. In one tomb were examples of pottery belonging apparently to the most primitive age side by side with the most developed stage of Mycenæan industry. These older shapes, the author concluded, had survived for the common purposes of daily life. The gold ornaments discovered consisted mostly of thin fillets or diadems on which designs were beaten out from moulds, the same mould being repeated over and over again on the same fillet. An Egyptian pectoral, inlaid with paste, of orange, blue, and white colour, and some gold fibulæ or peronæ, used by Greek women for fastening their dress on the shoulders, afforded additional evidence in support of the date the author assigned to the antiquities. A number of Egyptian scarabs were found, including one bearing the name of the Queen of Amenophis III. (c. 1450 B.C.), and another of the much later Orsokon dynasty of Egyptian kings, dating from the ninth century B.C. Discussing the presence of these two scarabs in a set of tombs which, from their general contents, could not have covered a period of much more than a century, the author contended that they could not both be contemporary with the kings whose names they bore. It was a matter of history that Amenophis III. became a Greek hero under the name of Memnon, and scarabs bearing his name were reproduced in comparatively late times for export among the Greeks. Turning to the decorative patterns ainted on vases and beaten upon gold, these

* See our last issue for particulars of the work carried out by the deceased gentlemen.

were interesting as carrying us back to the origins of industrial art in Greece. Nothing was more striking than to find representations of animal forms of the most extraordinary naturalism side by side with the most primitive exhibitions of decorative skill. There were illustrations of the cuttlefish, a favourite subject on pottery of the Mycenæan kind. To this day the cuttlefish is an article of food among the poorer people of Greece, and doubtless it was so in primitive times. Hence its being copied for decorative purposes. As, however, there was more of pattern than of naturalism in the form depicted, it was reasonable to suppose that a previous familiarity with spiral patterns evolved in technical processes had formed a basis of positive knowledge from which those early designers advanced towards the more speculative copying from nature. Discussing the spiral pattern on the gold ornaments and pottery, the author showed the difference in the treatment of this pattern on the oldest—Dipylon—pottery of Athens, and that on the Mycenæan specimens. Spiral patterns from among the many sculptured stones of Scotland were shown as evidence of the community of artistic instinct between the people of the Mycenæan Age and the Celts of Europe—a point now becoming generally recognised, but which the author had been well abused for suggesting at the time of Dr. Schliemann's discovery. As far as the excavations showed, the goldsmith seemed more at home in plant life than the vase-painter. The rosette and the palmette were equally common. In one instance there was a double palmette, of striking resemblance to a pattern hitherto supposed characteristic of Greek vases of the sixth century B.C. In another instance there was a complication of palmettes and spirals, almost suggesting a Corinthian capital. There were constant suggestions of the Ionic capital, but no sign of the Doric. There was an excellent example of a guilloche pattern incised on an ivory vase.

From the curious and almost bizarre blending of art revealed by the relics, the author inferred that the whole series belonged to a period when the Eastern Mediterranean was the scene of constant struggles for supremacy on sea among rival Greek or semi-Greek peoples.

The results of the excavations, Dr. Murray added, will shortly be published by the British Museum in a book upon which he has been a good deal engaged since 1896.

The Chairman called on Mr. J. L. Myers to open the discussion.

Mr. Myers said he thought it a great stroke of good fortune for the Institute to have secured Dr. Murray's statement regarding this excavation It was only when careful preliminary observations had been made that the real significance attaching to the casual stumble of an ox was realised. He desired to congratulate Dr. Murray on the exceedingly able way in which the excavations were carried out. The result had been one of the finest series of carefully tabulated exhibits in the British Museum. Both the Museum and Dr. Murray were to be congratulated on the result. So far as one could judge, the examples represented a phase of Mycenæan culture and art which had not been illustrated to them in so full a manner before. Differences had arisen as to the dates to which Mycenæan objects were to be assigned, but he was glad to think that on an occasion like that when their attention was directed to the decorative value of the results of these excavations, it would be out of place to go at large into a controversy of that sort. In Greece itself there appeared to be a silent space between the later stages of the Mycenæan culture and the earlier stages of the Hellenic, but in Cyprus—and, so far as he knew, only in Cyprus on any large scale—they had been able, to some extent, to fill in the gap which existed. He thought that Dr. Murray would admit, from various indications, that (to whatever period the Mycenæan Age was to be assigned as a whole) the majority of the finds at Enkomi must be attributed quite to the latter end of it. Dr. Murray had pointed out that a number of features occurred, not once or twice only, at Enkomi, showing that the Mycenæan artists in Cyprus had already to some extent passed under the influence of Egyptian art of a period by no means so early as that which seems chiefly to have influenced the Mycenæan art of the Ægean. In the same way Dr. Murray had pointed out, on more than one example, that there existed a correspondence between the work of these Mycenæan artists and of the artists of Assyria. In all probability we are dealing at Enkomi with a somewhat late prolongation of the Mycenæan Age in the Levant, beyond the point, so far as could be told at present, when the same art in Greece proper passed out of its bloom. Every one would agree with Dr. Murray when he emphasised the fact that in the best of the Enkomi works there was the beginning of that peculiar genius for dominating and assimilating to the proper purposes of decoration motives and so forth which were in themselves foreign to the Hellenic spirit. The great value of the Enkomi excavations had been that they had produced such a mass of first-class material. He would draw especial attention to the luxuriant variety of the treatment of spiral motives on the successive varieties of Mycenæan pottery — a class of motive which appeared at all times to have a peculiar fascination for any one who studied it—and to the skill with which at Enkomi Ægean artists succeeded in utilising the new Oriental motives which came before their eyes in the Levant, without deserting their hereditary allegiance to the naturalistic treatment of common objects which had led them to such artistic distinction in the Ægean. He had very great pleasure in proposing a cordial vote of thanks to Dr. Murray for his interesting paper.

Mr. A. H. Smith, of the British Museum, said it was his lot to go to Salamis to continue and bring to a conclusion the work which Dr. Murray had begun. Perhaps a few details as regards the site and the methods of excavation would be acceptable. The field of Enkomi was gently sloping towards the river bed. The whole of the field proved to be full of graves. The fact was entirely unsuspected until the ox put its foot through one of the tombs. That revealed the site. It was a matter of great importance that until then it had been totally unknown, because for centuries it had been a recognised industry amongst natives to take from the tombs all the gold which they could yield, the result being that tombs were stripped of their most valuable contents. At Enkomi, however, all knowledge of the site being lost, the excavators found an unusual number of virgin tombs. There was one, for instance, in which nails were around the tomb and silver cups still hanging on them. In the higher parts of the site the tombs were shallow, and in some cases carefully built of masonry. On the lower part the tombs were charged with water, so much so that the contents were brought up in the form of mud in buckets. Although the field of Enkomi was unsuspected, the immediate neighbourhood was a region of ancient monuments. Close by was the prehistoric building, half buried in the ground, now known as the chapel of St. Catherine (described in the fourth volume of the *Journal of Hellenic Studies*). Two large tumuli, also close by, were well-known landmarks, visible for miles across the plain. Shafts were sunk in both of these, and in one case a finely-built chamber of massive masonry was found in the centre. An entry was made with considerable difficulty. The chamber was found to be full of earth, and to have been entered, at forgotten times, by two previous parties. It therefore yielded nothing.

Professor R. Elsey Smith seconded, and said the illustrations and figures were exceedingly effective. He joined with Mr. Myers in congratulating Dr. Murray on his exceedingly valuable find. Of course, a great many other districts in Cyprus had been excavated. At the time of the Temple of Paphos there was a very large number of tombs excavated. Dr. Murray had said very little about the constructions of these tombs, but he did not think he could say that they found any built of masonry—nearly the whole were sunk into the earth, and in most cases were closed with slabs and approached by flights of steps, as many as twenty-five being found in some. The tombs they had found had been rifled over and over again and used over and over again by the Romans as well as for a Christian sepulchre. The objects found in this case were very mixed. Here were works of a comparatively early period mixed with later pottery and gold-work. But in these tombs there was nothing found in the way of monumental work in gold or any other material. They found at Paphos in the temple a bronze fibula, cased in gold, beautifully engraved. It took the form of a small stiletto with a head formed somewhat in the shape of a Corinthian capital.

Mr. Hugh Stannus said Dr. Murray had shown scientific discrimination in bringing the illustrations of his discoveries. He would like to speak about some of the shapes that were so delightfully lotus-like. They might be a degradation from the lotus, or they might be goldsmiths' work. They knew how pliable gold was, and one might almost say that wherever they found gold-work they got the spiral; the two went together. In a visit to the museum at Athens he had seen some of the Mycenæan finds of Dr. Schliemann, and he had been much interested in the technique, and had observed in some cases that the matrix was made of bone, hardened clay, or stone like lithographic stone. The patterns were sometimes scratched on and gold was laid over, and, with a blunt stylus, pushed in. As to the little cuttle-fish forms, in the find by Dr. Schliemann, which he had just referred to, he found that there were at least forty octopods. Each had a hole through it, and it was then worn as an amulet. When one realised what a terrible creature this octopod was in those seas, it was accountable that some seafaring man might have worn it as an amulet. He congratulated Dr. Murray on what he had unearthed for our national museum.

Mr. H. W. Brewer said that the decoration on one of the objects found was very much like basket-work, which seemed to be characteristic of all the ages. He should like to ask Dr. Murray if anything more of the kind was found.

Dr. Murray: No; nothing more.

Mr. Beresford Pite said that the subject was interesting from the artistic point of view, as well as from the archæological. Their old friend the Ionic volute occurred to his mind in connexion with the spiral volute derived from goldsmiths' work. Some of the objects which had been discovered showed a power and beauty which one was accustomed to in Greek work.

Mr. W. Brindley referred to the insecure manner in which some valuable gold objects were exhibited at South Kensington.

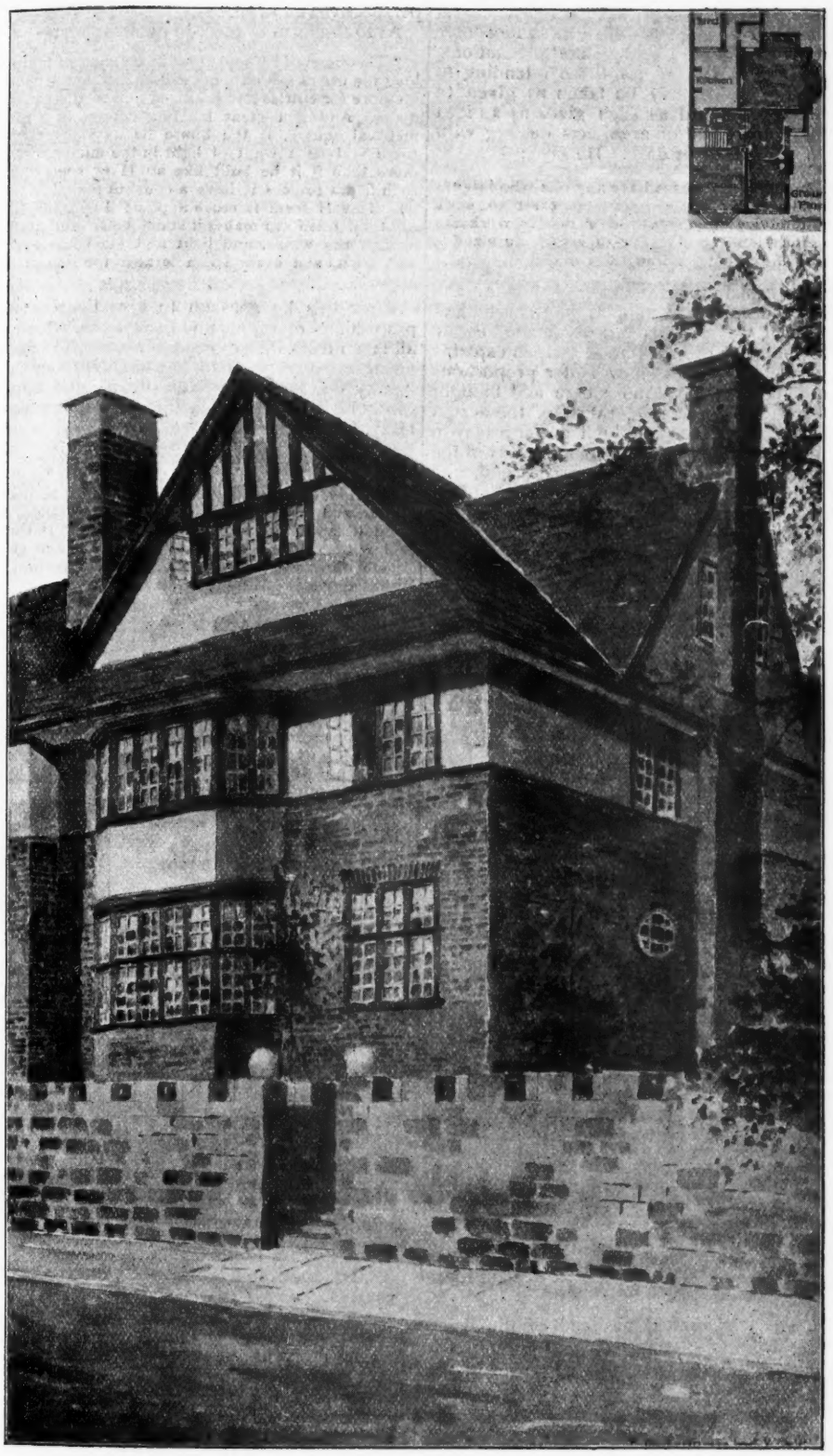
The Chairman, in putting the vote of thanks, said that a paper such as they had had read to them was of great interest on account of the insight it afforded as to the manners and customs of the people of a former age and as to the dawn of Western art. The description of the fibulæ Dr. Murray had given was particularly interesting. He had been trying to account for the similarity of details in the early periods of Western art in Phœnicia, Egypt, Greece, and Cyprus. It seemed to be agreed that that similarity was due to the close proximity of those countries, and to the people of those countries being easily accessible with each other. But was it not also possible that it was due to the influence which came from a distant country like India? The ivories on the tombs, which had been discovered in Cyprus, showed hunting scenes and contests between bull and lion; they were exceedingly alike in character to work he had seen in India, at Gwalia and Lahore. In the Western countries he had mentioned there were the Greek fret, the guilloche, the Ionic cap, and they were to be found in slightly different form in India. India was said to be the cradle of belief; why not the cradle of art?

The vote of thanks having been heartily agreed to,

Dr. Murray, in reply, said he had described the objects found and not the site. That had been described by Mr. Smith, who carried on the work after he (the speaker) had returned, and to Mr. Smith was due the credit for the very thorough way in which he had completed the task in a very trying climate. Professor Elsey Smith had referred to the tombs at Paphos. The excavations last spring undertaken by the Museum were in that district bnt proved a failure. In the matter of spirals, Mr. Stannus was perhaps wrong in what he said, because an English goldsmith had assured him (the speaker) that his way of making a spiral pattern was to get a piece of wire and solder it down to the required form, and then to work the gold over that. Whether the cuttlefish was or was not used as an amulet he did not know; but he thought the idea that it was taken for food was equally tenable. Mr. Pite's remarks as to the Ionic cap every one would agree with.

The meeting then terminated.

The next meeting will be held on December 4 for the election of candidates for membership.



Semi-detached House, Linthorpe, Middlesbrough.

SEMI-DETACHED HOUSE, LINTHORPE.

THIS house is to be built at Linthorpe, near Middlesbrough. The lower story will be faced with local red pressed bricks, and above the walls will be "rough cast" tinted with yellow ochre. The woodwork will be painted light Brunswick green, and the sashes white. The timber framing in gables will be coated with Stockholm tar. The architects are Messrs. R. Lofthouse & Sons, of Middlesbrough.

APPOINTMENT OF A SANITARY INSPECTOR.—The Local Government Board have sanctioned the appointment of Mr. G. T. Dewey as a sanitary inspector in Camberwell.

THE LATE SIR THOMAS N. DEANE.—At a special committee meeting of the Architectural Association of Ireland held on the 10th inst. the following resolution was passed :—That the committee, on behalf of the members of this Association, desire to express their sense of the great loss they and the architectural profession generally have sustained by the death of Sir Thomas Deane, and beg to offer their deepest sympathy with Lady Deane and members of the family.

ARCHITECTURAL CUSTOMS TWO HUNDRED YEARS AGO.

THE following is a portion of a paper read before the Architectural Association of Ireland, on the 7th inst., by Mr. T. E. Hudman :—

In these present times, when the extended nature of the works we are required to carry out necessitate that an architect should have a very complete knowledge of a great number of subjects, so that architectural education is receiving the careful attention of all those to whom architectural work is as much a pleasure as a work of profit, it is interesting to look back and see what standing an architect had, and what range of knowledge he was supposed to possess.

So far as I have been able to find out, architects were not formerly recognised as having the same offices or duties as now pertains. Until about the beginning of this century they were more of the character of artists who supplied the design and had nothing to do with the superintendence of the structure ; this latter part of the work was entrusted to a master builder, or, as we now term him, a clerk of works. Architects were frequently painters and sculptors, and also silversmiths, and we have many notable instances of their works in the masters of the Renaissance period of Italy. Generally speaking architects were called "surveyors" in all public documents, and in any large public building the architect was called surveyor to some Government department that had control over that building, and I think it is only on buildings such as these that we find architects taking any real part in the supervision.

The custom of the architect being in many cases only the provider of the sketch design, and not of the details, seems borne out in many ways. It has often struck me that work of the sixteenth and seventeenth century, although all at one in general character, yet shows great dissimilarity in the refinement or otherwise of its details. The troublous period of the Reformation and Cromwellian times had broken up the wonderful guild of cathedral builders. This and the resulting apathy to all things artistic, resulting from Puritan austerities, naturally resulted in a set of workmen incapable of putting refinement into their work unless ably directed. Later on, under the impetus to building which the Great Fire of London created, there arose a strong desire to work everything by fixed rule, and it was then that publishers began to publish the first series of books intended to educate the working man. There are two men who have been the subject of much abuse, Batty and Thomas Langley. When the Gothic revival first started there were many architects who were dubbed "Batty Langley" men. I had never seen Langley's books, but had read the reproachful things which Gwilt and others had written about them, and for years applied the term as expressing my own idea of work undeniably false and bad. Recently I came across a few of the Langley publications, and, although I cannot express admiration for their designs, I cannot help thinking that, considering the author lived in an age when all men practised the pure Classic cult and looked upon any deviation therefrom as a mortal sin, the designs of Langley showed considerable evidence of ability, and, as far as I can find out, Langley's education was practically nil. So that had he had the good fortune to start life with a store of knowledge and the benefit of foreign travel, his genius would have made him famous. I will quote you the preface of one of their books, called the "Builder's Jewel" :—

"Notwithstanding there are many volumes already extant on the subject of architecture, yet as not one of them are made a fit size for the pocket, and it being an impossibility for the general part of workmen to retain and carry in their minds all the useful rules and proportions by which works in general are performed ; I have, therefore, at the request of many good workmen, and for the sake of young students, compiled this work, wherein I have reduced the whole to such short and easy rules that the workman may not only at the first view renew his memory as occasion may require, but apprentices, who may be absolutely unacquainted with the noble art, and are so unfortunate as many have been, and are, to be bound to jobbing masters, who know but little, may without the help of any, by assiduous application at their leisure hour, in evenings when the business of days is over, make themselves such masters herein that few masters are willing to make them. And, indeed, I must own that 'tis a pleasure to me to see a spirit of emulation so powerful among young builders at this time, when every one of sense is endeavouring to become the most excellent in his way, and thereby make himself the most useful to himself and his country. It is useful knowledge only that makes one man more valuable than another, and especially that part of knowledge which immediately concerns the business he is to live by ; and therefore, if this work should prove a help to the improvement of knowledge in youth (for whose sake it is chiefly intended), and be no affront to the sage workman by re-informing him of those rules which have slipped his memory, and informing him of others which he never knew, it will answer the desired end of these well wishes."

This was published in 1746, and seems to my mind to reflect great credit on the Langleys. It is an early effort in the way of self-improvement for the workmen, and as such was much in advance of the times, and I think I must place Langley in the ranks of architectural reformers born too soon. And the thing we see from this preface is that the great increase in buildings consequent upon the Great Fire had raised up the never-ending crop of "jerry-builders," with the natural consequence of inferior workmanship.

Horace Walpole, writing in 1780, and re-

ferring to the commencement of that century, says :—

"Architecture was perverted to mere house building, when it retained not a little of Vanbrugh; and if employed in churches produced at best but corrupt and tawdry imitations of Sir Christopher Wren."

This reference to Vanbrugh is not meant as flattery on Walpole's part, for in another place he says of Vanbrugh that what Pope says of his comedies is much more applicable to his buildings—"How Van wants grace"—

"Grace!" shrieks Walpole, "he wanted eyes, he wanted all ideas of proportion, convenience, propriety. He undertook vast designs, and composed heaps of littleness. The style of no age, of no country, appears in his works, he broke thro' all rule and compensated for it by no imagination—he seems to have hollowed quarries rather than built houses."

Swift says of Blenheim Palace :—

"That if his Grace were no more skilled in the art of battering walls than building we might expect to see next year a mouse-trap man chief engineer."

Sir John Vanbrugh died in 1726, and Dr. Evans wrote on him this epitaph :—

"Lie heavy on him earth, for he
Laid many a heavy load on thee."

Walpole certainly did not like an architect to depart from a correct translation of Palladio, and this seemed to be the correct opinion of the time, for Campbell, in the preface to his "Vitruvius Britannicus" says of Palladio that he arrived to a "Ne Plus Ultra" of his art. With him the great manner and exquisite taste of building is lost, for the Italians can no more now relish the antique simplicity, but are entirely employed in capricious ornament, "which must at last end in the Gothic." I think the despairing gasp of that last sentence is very enjoyable to us moderns.

Speaking of Gothic, I will give another quotation, published in 1736. It says :—

"Gothic architecture is that which is far removed from the manner and proportions of the antique, having its ornaments wild and chimerical, and its profiles incorrect, and the whole massive, cumbersome, and unwieldy. The modern Gothic" [evidently meaning fourteenth century work] "runs into the contrary extreme, and is known by its disposition and by its affected lightness, delicacy, and over-rich, and even whimsical, decoration, as many of our cathedrals in England witness in the abundance of windows and figures with which every interstice is crammed."

After such a description of Gothic, it is not difficult to imagine what an amount of abuse they would have heaped upon the heads of Ruskin, Pugin, Pearson, and Street. But what creatures of fashion we architects are! Since the period of my quotation what numberless styles have been the vogue :—Merrion Square; Iron Foundry Gothic; Puginesque; Thirteenth Century French; Fourteenth Century English Gothic; French Boulevard Classic; French Château style; French Flamboyant; Queen Anne, and its accompaniment of Mary Anne; and now we are in the middle of a regular Scotch haggis of styles. Sometimes we see a new building, and, at a first glance, we say, "Ah, that's a nice piece of Renaissance work," until presently we turn a corner and see an Eclectic porch of the most pronounced "Arty Crafty" type—all brains and no form sort of thing.

I have got away from my subject, so let me get back to my period, and give you a few more extracts from old books. Sir Henry Wotton seems to have been an architect whose opinion was much sought after. I do not know much about his work, but quotations from his literature are numerous in the architectural writings of the time. In his "Hints on Planning Houses" he gives the following quaint and sage advice :—

"'Optical Precepts' concern a well-chosen prospect, which may be styled the royalty of sight, for as there is a Lordship (as it were) of the feet wherein a man walks with much pleasure about the limits of his own possessions, so there is a Lordship likewise of the eye being a roving and imperious sense, cannot endure a narrow circumscription, but cannot be gratified both with extent and variety. A fair entrance with an easy ascent gives great grace to a building—'A Political Precept.' By no means build too near a great neighbour, for this were to be unfortunately seated on the earth, as Mercury is in the heavens, for the most part in combustion or in obscurity under brighter beams than his own."

There is a little of the ingenious and docile character about this advice. In his "Precept about Contrivance," his advice throws a little light upon the manner of preparing drawings and the kind of drawings that were prepared in those days. He says that "contrivance" is a thing of great moment which he cannot enter upon before giving a few general precautions, and as he is writing for those intending to build, his advice may be taken as given to possible clients, and as such gives us an idea as to the manner of architects dealing with their clients in those days. He says :—

"I would by no means have any one who intends to build either for use or ornament set to work without advice of a surveyor or master workman who understands the theory of architecture and is capable of designing a draught or model."

I may explain that the drawing showing the design is usually spoken of as the draught, and the model was very commonly made to scale of any building of importance; which explains why some buildings show better proportions than others; they had more care and thought bestowed upon the preparation of the design so that the workmen could not go far astray in the details. But to return to my study of the advice of our two-hundred-year-old friend, who continues :—

"The model should be made according to the rules of art. If a draught be resolved upon there ought to be the ichnograph of each floor and also the orthography of each face of the building, viz., the front, the flanks, and the rear. But if the workmen be skilled in perspective then more than one face may be represented in our diagram, scenographically."

It would cause a considerable amount of surprise to a contractor nowadays were we to give him perspective drawings instead of the usual elevations. But any of you who have studied the old style of carpenter and his ways (and he is very prevalent and useful as a shop foreman and "setter out") will frequently notice that in setting out work for the bench he gives a kind of isometrical perspective of the work to assist the workmen's ideas of what the work will look like, and I expect this is a survival of this old custom alluded to, and which is so well illustrated in Thorpe's book of drawings. But to return to our adviser :—

"In the contrivance of these designs, whether for the draught or model, the quality of the persons for whom the building is erected must be considered in respect of the ichnographical plots especially, for noblemen have occasion for more rooms of office than others of a meaner degree, all which must be designed according to the rules of proportions: also the ichnograph of all chimnies, both in length and breadth of the hearth and jambs, bed places, stairs, and the latitude of all doors and windows in each floor;" and he goes on to say that "the sizes of all wall-plates, girders, trimmers, joists, dragon beams, partitions, all ovens, stoves, boilers, furnaces, coolers, vats for brewing with their just measures. All which dimensions I would advise to be set in the proper places in the diagram in characters, because unless the schemes be very large it will be difficult to take dimensions nicely of the smaller parts, and perhaps of the great ones, too."

You see there was a dread of the bricklayer's ever erring rule in those days. As to the elevations, he says :—

"In the orthographical schemes there must be true delineations and dimensions of each face and all its concomitants, as doors, windows, balconies, turrets or cupolas, clumsy shafts, facias, rustic quoins, architraves, friezes, cornices, pediments, pilasters, columns, shells over doors, lantern, and all other ornaments. The ichnography, orthography, and sceneography of the staircase may also be delineated, and all its parts, as handrail, risers, nosing of the cover or top, string board and mouldings on it, or cartouches, balusters, pendants, &c., with their true positions, forms, and dimensions, all which being carefully done by an ingenious surveyor, I think it is almost impossible for a careful workman to mistake or commit any blunders."

How many of us have thought the same thing only to find that the one thing we considered to have drawn in the clearest and most unmistakable way was the part least understood. The mistaken notion which the lay mind frequently gets of a building from geometrical drawings was apparently felt 200 years ago, for our adviser says on this matter :—

"Let no man who intends to build settle his fancy on a draught of the work or design in paper or vellum, how exactly soever delineated or set off in perspective, without a model or type of the whole structure, and on every parcel and partition, either in pasteboard or wainscot. Let the model be as plain as may be, without colours or beautifying, lest the pleasure of the eye preoccupy the judgment."

I expect it is from this came the well-known clause in competition conditions, "No coloured perspectives allowed."

As to the form of plan, to quote again :—

"'Tis observed by some that in building of houses long the use of some rooms will be lost, and it takes up more for entries and passages and requires more doors. And if a great building consist of a geometrical square, if the house be anything large, there will be a want of light in the middle rooms more than if it be built like an H or some other such figure (unless it have a court in the middle of it). This H form is much applauded by some, for, say they, this form makes it stand better and firmer against the winds, and light and air come every way to it, and every room is near the one to the other."

After this he goes on to give the size and proportions of rooms and their doors, which is all taken from Palladio and Vitruvius, to which he agrees except as to the kitchen offices, or "petty offices," as he calls them; and apparently he had not much idea of Italian hospitality, for he says :—

"The petty offices may be well enough, so remote from the building, for Italy; yet by the natural hospitality of England, the buttery must be more visible, and we have occasion for larger ranges or chimnies and more ample kitchens than the Italians, and not so remote from the dining-room, or else, beside other inconveniences, perhaps some of the dishes may straggle by the way."

The last sentence shows that the honest serving man and maid needed watching, even in those days.

I daresay you have noticed old houses having rooms opening off one another. On this point our friend offers an explanation: that he does not approve of it, as it destroys the privacy of the dwellings, and says it was "grounded upon a fond ambition of displaying to strangers all their furniture at one view."

He gives several proverbs as guides to design, as :—

"Let not the common rooms be several, nor the several rooms be common.

Light (God's eldest daughter) is a principal beauty in building.

A house had better be too little for a day than too great for a year.

'Tis easier borrowing of your neighbour a brace of chambers for a night than a bag of money for a twelvemonth.

Many by overbuilding their house have impoverished their estate."

All wise, sage advice, but I doubt if a neighbour who was always borrowing bedrooms for his guests would be looked upon with much favour.

From these quotations you will see that the architects of 200 years ago had very sound ideas as to their work, and had very clear ideas as to how they should express them. I could give you many more extracts of a similar nature relating to the planning, &c., of buildings, but time and the fear of wearying you prevents.

As to legislative enactments, the hard and fast lines of which we in these days frequently find to be very vexatious and annoying in special work, they had their "little say" in the work of the time I write about; and I think it will be interesting to glance at them, because I think you will agree with me that some had a permanent effect on style.

The half-timbered style and its successor with wooden medallion cornice and porch did not altogether go out of date by the rule of fashion; and the brick cornice, with its parapet and internal gutter, did not displace the overhanging eaves by reason of the same caprice, but that the will of the sovereign Parliament so directed it.

The earliest record of an Act of Parliament relating to building was in Elizabeth's reign, but I have not been able to find it. The earliest one that I have been able to find is in Charles II.'s time, and it relates to party-walls and foundations, and enacts that no foundations shall be laid in London till proper surveyors appointed by the Lord Mayor had viewed the same and seen the piers and party-walls equally set out; that before such survey be taken the builder shall enter his name with the Chamberlain, and the place where the building is to be erected, paying 6s. 8d. for an acquittal, which shall entitle him to have the foundation set out by a proper surveyor within three days after producing the same. As to party-walls, it was enacted that there was to be a party-wall of brick or stone between every two houses for preventing the spreading of fires, and the thickness to be a brick and a half for

all floors except the garret, which was to be one brick thick; and to prevent disputes it states that these party-walls be set out equally on each builder's ground, and whoever first builds shall leave a toothing on the extremes of his front and rear walls for that of his neighbour, to be firmly incorporated therewith when he shall build.

That the second builders shall not build against the said party walls till they have paid the first, the half charges of such party wall, with interest at 6 per cent. from the first building; and the price to be paid is fixed at 5*l.* per rod. There is also a penalty of 50*l.* for taking benefit unlawfully of such party wall, and also against having any cupboards or timber in such walls. By the further acts of Charles II. it is laid down that no timber is to be placed within 12 in. of the fore-sides of chimney breast, all joists at the back of chimneys to be laid with a trimmer at 6 in. distance, and no timber should be laid in the funnel of any chimney; and the penalty is 10s., and 10s. per week for all the time it is unreformed. It will be readily seen that these Acts were the foundation of the present London Buildings Acts, and also of the numerous by-laws relating to buildings of the several corporations and sanitary authorities throughout the kingdom, and the "Merry Monarch" must at least be credited with the desire to see his subjects decently housed.

In Queen Anne's time some further provisions were enacted, which I think must have had some distinct influence in forming many of the characteristic features of the style we know as Queen Anne. It was then enacted of party walls as before, but with the important addition that they must be carried up 18 in. beyond the roof, and also that no cornice or modillion of wood shall be fixed under the eaves of any house or against the front or rear wall thereof; that the front and rear walls of every house shall be entirely of brick or stone and carried 2½ ft. above the garret floor and coped with brick or stone. I think here we have an Act of Parliament giving directions for a distinct change of style, as it would be obviously impossible to make a building look decent which slavishly followed the Act. The parapet and coping gave us the brick cornice and internal gutter, and the carrying up of the party walls gave us the ornamental brick gable. It was also enacted in Anne's reign that the backs of all chimneys shall be at least one brick thick, and that all flues shall be plastered or pargeted from top to bottom; that all fireplace openings shall be arched and all hearths shall have a trimmer arch under them of brick; that no wood or wainscot shall be fixed to the front of any chimney breast. This last enactment evidently gave the death blow to the oak panelled room and its accompanying mantelpiece, and was the starting point of the marble workers boxed-out mantel; and I notice in the advertisements of the time a book called the "Mantelpiece Makers Daily Assistant."

All the enactments ordering brick to be used doubtless caused a great impetus in the brick-making industry, with the usual result—the makers endeavouring to meet the demand were led into making inferior bricks: for I find in George I.'s time enactments relating to the manufacture of bricks, which state that earth or clay designed for making bricks for sale shall be dug and turned at least once between November 1 and February 1, and not to be made into bricks till after March 1, and no bricks to be made for sale but between March 1 and September 29; all bricks are to be burned either in kilns or distinct clamps, each sort by itself; and a later Act states that sea coal ashes sifted or screened through a sieve ½-inch wide, may be mixed with the clay, not exceeding twenty loads to the making of 100,000 bricks, each load not exceeding thirty-six bushels. Stock bricks and place bricks may be burned in one and the same clamp, so that the stock bricks be set in one distinct parcel, and not mixed or surrounded with place bricks. It was also enacted that for the more effectual securing of these statutes and for the better discovery of offenders, the Master and Wardens of the Company of Tilers and Bricklayers should have power to search brick kilns, &c.; but, they having permitted and even encouraged divers persons to make bricks contrary to statute, they were divested of their power, and it was transferred to the Justices of the Peace. The penalty was 20s. per 1,000 bricks; 10s. went to the informer, 10s. to the poor of the parish. What a glorious harvest the poor would reap if this Act were in force now. It was also enacted that the bricks be 8½ in. long, 4 in. broad, and 2½ in. thick.

Many other sizes of bricks were made and used, but the sizes in the Act were made and sold for many years afterwards as statute bricks.

You will notice that I have mentioned stock bricks and place bricks were to be kept distinctly separate in the kiln. This seemed to me peculiar, because nowadays we understand place bricks to be a soft and defective stock brick. After searching I discovered the meaning of it; stock bricks and place bricks were in those days two distinct classes of brick made in different ways and of different clays. The stock bricks were made of a stiff marly clay and made on a board called a "stock," which gave it its name; the place brick was made of a softer clay, and being much more delicate to handle, and dry, it was necessary to prepare a place close to the moulding board to "place" the bricks upon to dry, and prevent their being damaged by too long carriage or much handling, and for this reason they were called place bricks. I found this corroborated by several writers of the time, so I think I can fairly put it forward as correct.

THE ARCHITECTURAL ASSOCIATION DISCUSSION SECTION.

THE third meeting of the Discussion Section of the Architectural Association for this session was held at 56, Great Marlborough-street, on the 17th inst., Mr. W. B. Hopkins in the chair. Mr. Robert Williams read a paper on "Tenement Houses for the Working Classes," approaching the subject from a somewhat Socialistic point of view. He laid down as a basis the following four aphorisms:—1. Human life is inviolable. 2. Man has a right to the use of a part of the earth whence to extract food, whereon to find a breathing space, and whereon to erect a shelter, a house, or home. 3. In the action of breathing each exhalation contaminates the surrounding air; Nature has therefore arranged (1) that trees and vegetation shall be helped to grow by the absorption of the poisonous gases which man exhales, and (2) that there shall be a boundary line, as to area, within which people may dwell healthily as regards light, air, and space, but over which none may step without endangering life. 4. As the density of population per acre, other things being equal, so the disease and death rates. Having dealt historically with the subject, Mr. Williams examined critically the results of the recent L.C.C. competition, and the methods of the L.C.C. in dealing with the housing question.

Mr. H. T. Hare, in proposing a vote of thanks to Mr. Williams, spoke on the question from an architect's point of view. The Rev. J. E. Hand urged the members to study the subject not only from the architect's standpoint, but also from the position of citizens. The discussion was continued by Messrs. Strange, Satchell, Langton Cole, Brodie, Cranfield, and Greenop.

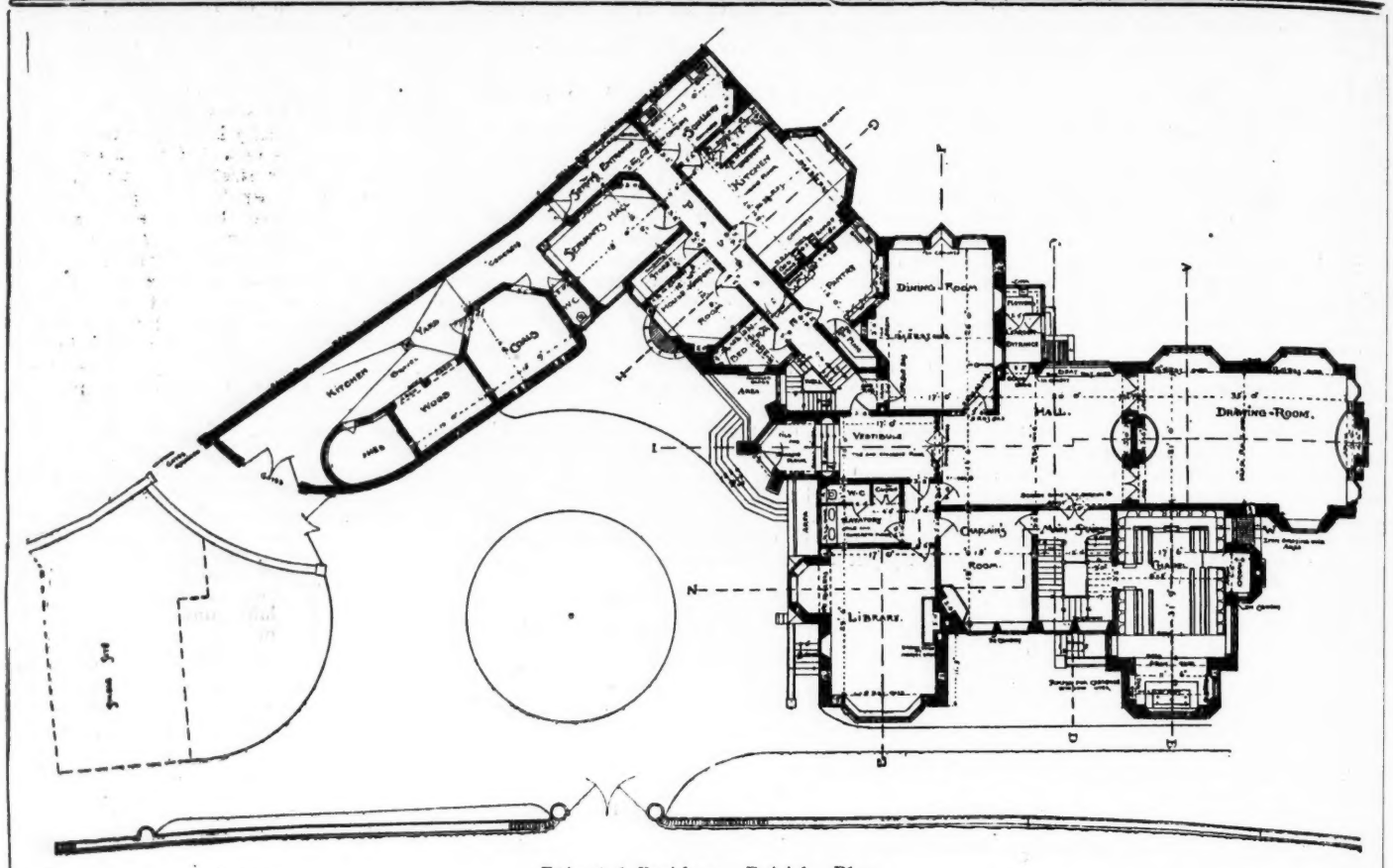
Mr. T. Blashill summed up the discussion, and the meeting terminated after according a vote of thanks to Mr. Williams.

ARCHITECTURAL SOCIETIES.

THREE TOWNS BRANCH, DEVON AND EXETER ARCHITECTURAL SOCIETY.—The inauguration of the fourth session of the Three Towns branch of the Devon and Exeter Architectural Society took place on the 16th inst. at the School of Art, Princess-square, Plymouth. Amongst those present were Mr. Charles King, President of the parent society; Mr. Henry Geo. Luff, the newly-appointed chairman of the branch; and Mr. B. Priestley Shires, hon. secretary and treasurer of the branch. After some preliminary business, Mr. Luff delivered his opening address, during the course of which he said:—This being the first meeting of the Session 1899-1900 of the Three Towns branch of the Devon and Exeter Architectural Society, I take the opportunity of thanking you for having elected me as chairman in succession to Mr. King (now president of the parent society). . . . It is very gratifying to know that so many members of the profession have joined our ranks, but it would be much more so if every remaining bonâ-fide architect living amongst us would do likewise; then there may be a better chance of our influence, as a body, carrying more weight on all questions affecting our professional position. As to the question of registration, I hope that it may soon become a matter of law. Personally, I am sorry that the Institute has opposed the Bill so far, considering how successful the examinations instituted by that body have proved for some years past, and it appears to me especially hard upon those men who have passed the ordeal of those examinations that, on their starting a practice, they should have to compete with irresponsible people who have never had so much as one day's professional education. As soon as the particulars of the competition for the Plymouth Institution in George-street were issued your Committee was at once called together to discuss the conditions, when it was thought necessary to suggest certain alterations in the same, and I am pleased to say that most of what appeared to us as essential points for alteration were promptly acceded to by the Institution Committee. I understand that a member of our Society has been successful in gaining this competition. Nothing further of any great interest locally has taken place since our last meeting. I would suggest that we one and all should do our best to attend all meetings, thereby strengthening the position of the Three Towns branch, and forming ourselves into a band of brotherhood, essaying to know more of each other and trying to assist each other as far as we can, thereby completely upsetting that horrible notion, which I am afraid exists in some minds, that because we are all of one profession we must necessarily be antagonistic one to another.—Mr. King, in proposing a vote of thanks to Mr. Luff for his address, said the question of registration of architects was in the hands of the architects themselves, and should be pressed forward at every available opportunity. Mr. Parker seconded, and the motion was agreed to.

THE ARCHITECTURAL ASSOCIATION OF IRELAND.—On the 21st inst. a meeting of this Association was held in the Grosvenor Hotel, Westland-row. Mr. G. Sheridan, President of the Association, occupied the chair. Mr. Anthony Scott opened the proceedings by reading a paper upon "The Round Towers of Ireland." In the course of his remarks he said that to-day but one-half remained standing of the number of round towers whose existence was recorded in history, and of these many were in various stages of decay, and were destined, in the course of time, to go the way of the others. In referring to the work accomplished by Petrie, O'Curry, and O'Donovan, in regard to the history and uses of the round towers, the lecturer strongly condemned the policy of the English Government, insp red by Elizabeth and Carew, in destroying all the ancient manuscripts relating to the history of Irish architecture. To that cause was to be attributed the mystery which had so long enveloped the history of the round towers of Ireland. From his investigations he was led to the conclusion that these towers were of a type of architecture peculiar to the early Christian era, and had been, not improbably, erected to form a place of security for the sacred vessels and the furniture of the churches to which they were attached, against the encroachments of the Northmen, as was the case in Brittany. It was quite manifest that the towers could not be of Danish construction. If they were, the majority of them should be found in the counties of the Danish settlement in Ireland—which was not the case. There were many evidences to support the theory that the towers were of Christian origin, and in several instances they appeared to be of even later erection than the churches which they adjoined. The lecturer then proceeded to describe, in detail, the peculiarities of the architectural design of the principal round towers of Ireland. Mr. Geoghegan, in proposing a vote of thanks to the lecturer, said he differed almost entirely from the views put forward in the paper. He was of opinion that the Irish round towers dated from Pagan times. Mr. Doolin, Mr. Lynch, Mr. O'Brien Smyth, and Mr. Glover took part in the discussion which followed, the general opinion being that the towers were of Pagan origin, but were adopted by the early Christians and rebuilt by them. A number of lantern slides illustrative of the paper were shown. A vote of thanks to Mr. Scott for his paper was agreed to.

LEEDS AND YORKSHIRE ARCHITECTURAL SOCIETY.—On the 20th inst., at the Queen's Hotel, Leeds, the opening meeting of the new session of the Leeds and Yorkshire Architectural Society was held, the chair being taken by Mr. W. Carby Hall, President. The Presi-



Episcopal Residence, Bristol. Plan.

dent said he was glad to be able to say that the Society was gaining rapidly in strength and importance. It only required, he thought, a little more cohesion to make it of very great service both to members and their clients, and—he said this in all humility—to the city authorities. He regretted that more architects of Leeds and the county were not included in the lists. There were 367 architects in the Society's area, but only fifty-nine were members, while of forty-eight members of the Royal Institute only thirty-six belonged to the Society. Hull, for instance, was represented by only one. He suggested the formation of local Councils in connexion with the Society, and an annual dinner, held every other year in one of the outside principal towns. After congratulating the Hon. Secretary, Mr. Francis W. Bedford, on the success of his work for the Society, Mr. Hall spoke of the educational side of the institution, mentioning what was now being done at the Yorkshire College and Leeds Institute, and commenting on the need of a Decorative Art Museum as an aid to teaching. He highly commended the proposal to start regular sketching visits to instructive buildings during the coming spring and summer, and hoped it would be the beginning of a movement for teaching architecture in a systematic and complete manner in Leeds—a school of architecture, in fact, equal to that at Liverpool. Acknowledging the enterprise of members' clients, the President was glad to think that the responsible people who had given out commissions for some of the larger buildings in Leeds realised that there was an abundance of local ability equal to the execution of any work that might be required. Touching upon the various disputes in the building trade, he said the bricklayers' strike was still unsettled, and would most likely remain unsettled for a very long period. The most unfortunate part of this matter, he observed, was that the architect saw his buildings practically at a standstill, and was the recipient of many unhappy visits from clients who, as a rule, thought the architect should rise superior to such mundane things as strikes. He hoped the time was not far distant when we should have a Government Labour Bureau or some similar office formed for the purpose of intervening at the outset of trade disputes, and thereby preventing the disturbance which, under present circumstances, ensued. As to the services architects might render the Leeds Corporation, he was pleased to say that the Library Committee had accepted some suggestions offered by the Society, and had asked the Society to appoint an assessor in the case of a competition for a branch free library. If other Corporation committees and public bodies would allow the Society to assist in the preparation of conditions, he felt that they would get better value for their money. In conclusion, he said he thought they could all thank the City Council for the spirited way in which the many needed improvements in the city were being tackled. Looking back over the past few years it was marvellous to contemplate the progress which had been made in all parts of the city, and he was glad to see that the energy, resource, and enterprise shown by the authorities had produced the same qualities in the minds of the private citizen. It was a pleasure to see Leeds thoroughfares becoming, from an architectural standpoint, more worthy of the fifth city of England. On the motion of Mr. T. Butler Wilson, seconded by Mr. Beevers, a vote of thanks was accorded to the President for his address. The Society's silver medal was also presented. It goes to Mr. W. F. Copp, along with a prize of five guineas. The sketching prize of a like amount was awarded to Mr. S. R. Whincup. The prize-drawings were exhibited to the assembled company.

Illustrations.

EPISCOPAL RESIDENCE, BRISTOL.

THE two drawings included under this head show two views of the new Episcopal residence at Redland Green, Bristol.

The old Episcopal Palace within the Cathedral precinct was destroyed in the riots in Bristol in 1831, and this house has now been built partly out of private munificence, to supply its place.

The architect is Mr. W. D. Caröe, who has treated the building with great picturesqueness without rendering it in any way pretentious. The shape of the site was probably to some extent suggestive of the peculiar but effective lines of the plan, one floor of which is shown here on a larger scale than that given on the lithograph. The walls are chiefly treated with roughcast, with a stone basement and hanging tiles in the gables, and the chimnies finished with circular stone shafts. Chimnies of this type are frequently found in South Wales; there are a good many about Tenby and in other sites in Pembrokeshire, though we are not aware that there is any precedent for them in buildings more closely connected with the Bristol neighbourhood. They have at all events a characteristic appearance.

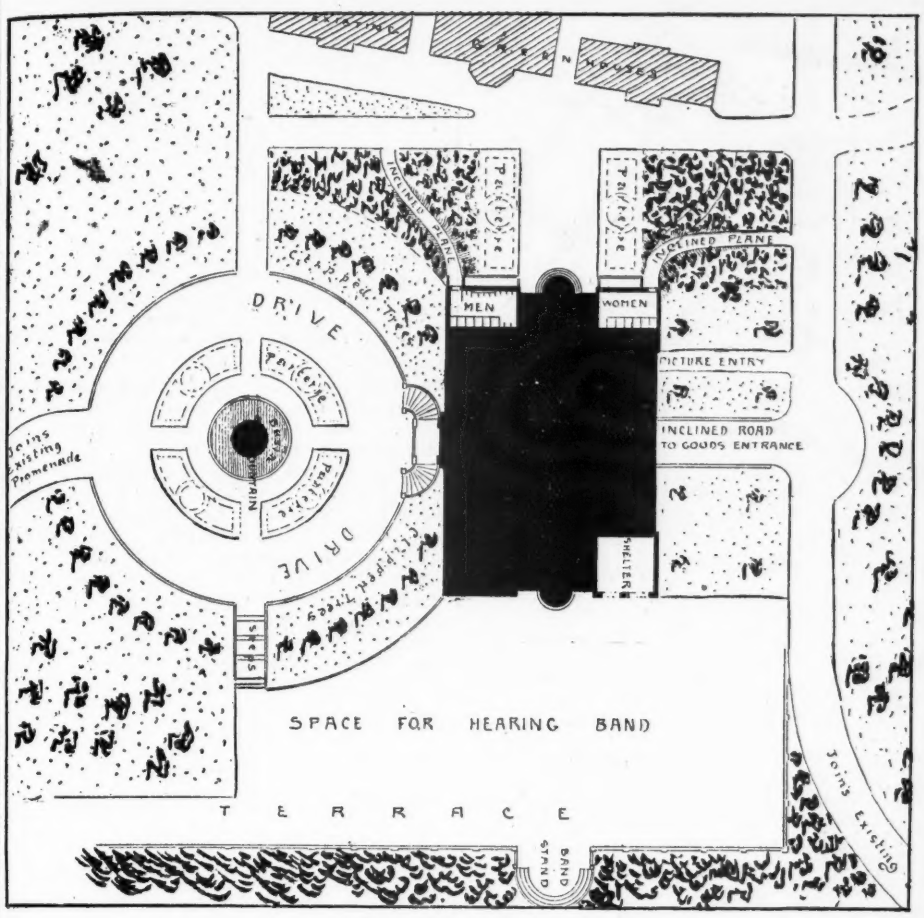
The contractors were Messrs. Stephens & Bastow, of Bristol.

COMPETITION DESIGN FOR THE CARTWRIGHT HALL, BRADFORD.

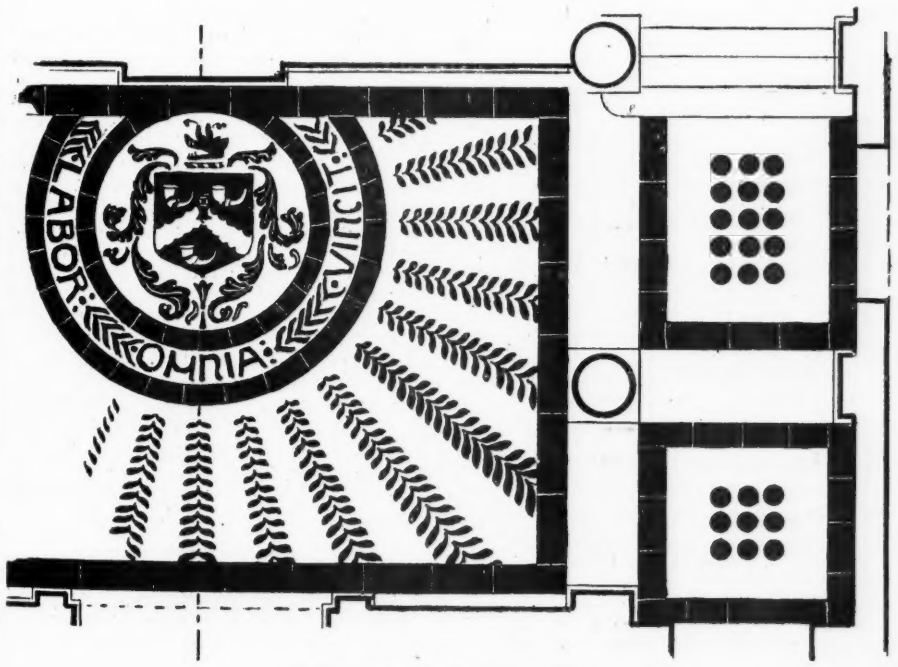
THOUGH this design did not obtain a premium, there are points in it which it is hoped may be of some interest, and there is the additional excuse for publishing it that, owing to the improper action of the Bradford officials in affixing the authors' names to all the designs when exhibited, without asking their permission, the author of this one was precluded from allowing any notice of it to appear in the general review of the designs in the *Builder*. It may be mentioned that the course adopted by the Editor of this journal, in cases when he has been himself a competitor and the designs had to be reviewed, has been to place the review in the hands of a contributor who was not aware that the editor was among the competitors, and to print whatever criticism was made on his own design, favourable or the reverse, so that the critique should be as independent as in any other case. Finding that in this case his name had been publicly affixed to the design, he could only instruct his reviewer to omit any mention of it in the article.

The architectural treatment of the exterior is based on the assumption that as the building was essentially a monument, and standing separately upon an open site, it should have as much as possible a monumental aspect. Hence the employment of a large exterior order, with heavy rustication in the lower portion, and the arrangement of the windows so as to leave at the ends of the building a great mass of rusticated masonry unbroken by openings. This monumental idea was proposed to be further emphasised by repeating in the Central Hall the same order and proportions as in the exterior, with the same heavy rustication on the lower portion of the columns, the moulding masking the face of the balcony floors being the repetition of the first floor string-course on the exterior, and at the same level. I suggest this as a point for consideration in the case of buildings of monumental type—whether there is not a greater unity of architectural conception obtained by treating the main interior apartment on the same lines as the exterior; instead of finding, as we often do, an interior treatment of a different order and proportion from that of the exterior.

The treatment of the principal staircase as a single one, rising unsymmetrically along the side of the hall, is not one I would recommend in general, on architectural grounds; it was adopted here with the object of securing a wide staircase without encroaching more than could be helped on the limited floor-space of



Plan for Laying out Ground.



Sketch for Marble Pavement in Hall.

Competition Design for Cartwright Memorial Hall.

the hall, or blocking the vista of the longitudinal corridors. The treatment of these corridors, with their small colonnades seen from either end across the intervening space of the hall, was suggested by the charming effect of the same kind which formerly existed in Barry's Royal Institution at Manchester, and which some vandals of that city have destroyed in order to get two more small rooms. In the lower corridors the windows between the columns were to be made the opportunity for an exhibition of modern stained glass, and in the upper corridors, where top light would be available, the same spaces were to contain sculpture alternating with the columns. The upper corridors each terminate in an apse in which would be placed a more important group of sculpture lighted from a small dome in front of it, each such group being seen from the opposite end as the termination of the vista.

The ladies and gentlemen's cloak-rooms on the ground floor form the only instance in which the first instructions have been departed from. The instruction was that these cloak-rooms were to be on the upper floor, a perfectly absurd idea where there is to be a state staircase to lead up to a reception-room, as the stairs would then be used by an assemblage of people in cloaks and overcoats and wraps; whereas the staircase in such a case is a state affair, and all *impedimenta* should be got rid of before it is ascended.

These cloak-rooms were intended for use only at receptions, when the building would be closed to the general public; the doors marked A.A. would at ordinary times be closed by revolving shutters, which would be drawn up on reception-nights, leaving a range of openings unencumbered by doors.

Otherwise, the plan has been made with an almost rigid adherence to instructions as to size of rooms, &c., which is the reason why the two blocks of the end elevation are not symmetrical in width, the instructions having given a somewhat greater width for the entertainment *suite* than for the art-gallery. The small room for cabinet pictures, which balances the black-and-white room at the opposite end of the art galley, is however an "extra." The public restaurant was to be in the front basement, (right hand of the south elevation), under the Mayor's dining room, so, that by means of a lift, both could be served from the same kitchen in the rear of the basement. The high narrow door to the picture lift, seen on the back elevation, may be mentioned. Most of the competitors, I believe, put the picture entrance in the basement, but it appeared to me that as the pictures were not wanted in the basement but in the Art Gallery, the simpler way was to put a ground floor opening into a lift immediately under the Art Gallery floor, and high and long enough to take easel pictures of the largest size usually painted in this country.

No provision was made for mechanical ventilation in a general way, because a museum and art gallery are never much crowded and are easily ventilated, and to keep up mechanical ventilation all the year round for such rooms would be an unwarrantable expense. But the occasional assemblage of a number of persons to a reception and dinner would constitute a special state of things, and this was to be provided for by an extract fan in the tower in the centre of the front, the air being drawn into the rooms warmed, through the radiators.

The instructions included a scheme for laying out the ground, which is shown in the accompanying plan, where the block plan of the hall shows also the positions in the basement of the public conveniences and the shelter. As there was to be an open space provided for hearing the band, it appeared that here would be the place where the shelter would be most required in case of a sudden shower. The public conveniences were to be accessible either from the interior of the building or from the grounds; access from the latter is provided by inclined walks concealed among plantations, from the former by separate staircases in the building.

A sketch for the floor of the hall, to be treated in marble inlay, with the Bradford arms and motto as a centre, is also given.

At 1s. per cubic foot (the lowest price that ought to be assumed) the cost worked out to just within the stipulated amount.

In one respect this set of plans was possibly unique among those submitted, in that they were all drawn from first to last by the author's own hands. H. H. STATHAM.

THE NEW HEAD OFFICE OF THE YORKSHIRE BANKING COMPANY, LEEDS.

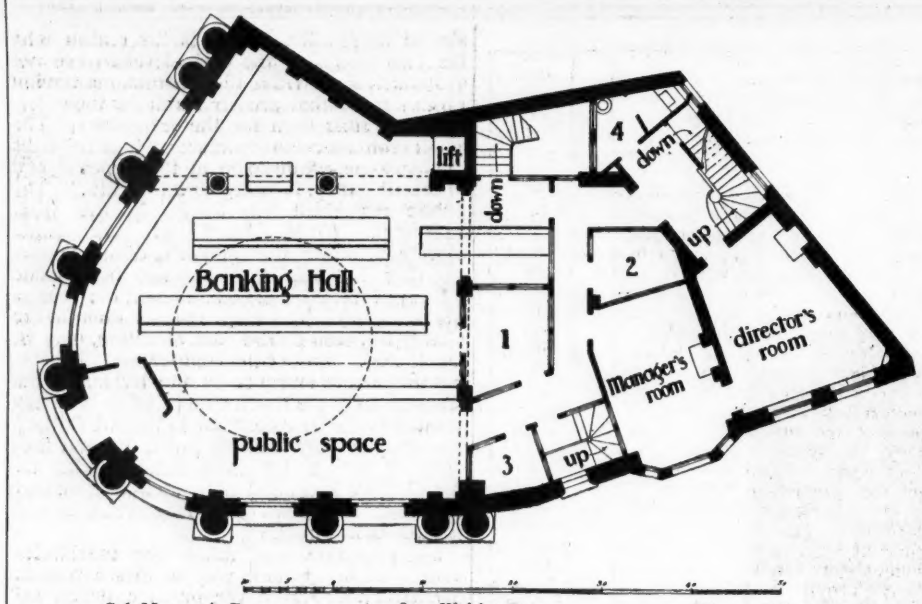
THIS bank, opened some five months since, is erected on the site of the old office and an adjoining building opposite the "Queen's Hotel," at the corner of Boar-lane and Bishopgate-street, Leeds.

The exterior of the bank, circular in plan, is designed in a single order of attached Ross-o-Mull granite fluted and polished Corinthian columns, 3 ft. in diameter and 30 ft. high; the caps being carved in Bolton Wood stone with moulded bases of Grey Aberdeen polished granite, the whole resting on a massive surbase also of polished Grey Aberdeen, the lower base being in rusticated rock-faced grey granite. The bays between the columns are faced with Bolton Wood stone with pedimented windows, over which are carved panels containing the arms of various towns where the more important branches of the bank are situated. The façade is surmounted by a balustrade with arms in the centre and sculptured groups at each end—representing two of the great industries of the county, viz., Manufacture and Agriculture.

The bank is roofed by a large copper dome 40 ft. in diameter, glazed to a certain height above the springing, and by a skylight inside the corona at the top.

The administrative block, which occupies the Bishopgate end of the building, is also faced with Bolton Wood stone with rusticated granite base. The total frontage of the building is 156 ft., and the total area about 3,750 ft.

Internally, the ground floor contains the banking hall—irregular on plan, with circular front to Boar-lane, average 40 ft. by 40 ft.—also the directors', manager's, and waiting-rooms, lavatory, staircase, &c., with private entrance.



1. Sub-Manager's Room. 2 & 3. Waiting Rooms. 4. Manager's Lavatory.

The Yorkshire Banking Co.'s Office, Leeds. Ground Plan.

The banking hall is a lofty apartment, 27 ft. high to the top of the main cornice, from the centre of which springs the inner dome, 22 ft. in diameter, and rising to a further height of 13 ft. The total height from floor to crown being 40 ft. The dome is filled in with hand-painted glass. The walls are lined with egg-shell glazed tiles of a pale blue-green colour, with Numidian marble dado. The whole of the interior fittings are executed in Cuba mahogany. In the basement are a series of strong-rooms. The first floor contains directors' luncheon-room, inspectors' and stationery rooms. The caretaker's apartments are on the second floor.

The constructional ironwork in columns and main girders was supplied by Messrs. Leonard Cooper, of Leeds. The constructional iron-work of domes and the girders supporting them, together with the glazing, were executed by the British Challenge Glazing Company, in conjunction with Messrs. Young & Co., ironfounders, London. The strong-room doors, &c., were supplied by Messrs. Milner & Co., London, &c.; the heating and electric lighting installation by Messrs. Dixon & Sons, Leeds; the hydraulic lift by Messrs. Clarke, Bunnett, & Co., of London; the fire hydrants by Messrs. Shand, Mason, & Co., London; the mosaic floor by Messrs. Diespeker & Co., London. The carving was executed by Mr. Thewlis, of Leeds. The bank fittings, counters, desks, &c., were supplied by Messrs. Shepherdson & Son, of Driffield; the counter grille by Messrs. W. T. Allen & Co., of London; the granite and marble work by Messrs. Fenning & Co., London. The general contractors were Messrs. Armitage & Hodgson, of Leeds.

Mr. E. Roscoe Mullins, of London, designed and modelled the coats of arms for the panels over the windows, and designed and sculptured the colossal groups at the two angles of the building.

Mr. R. Wheeler was the clerk of works, and the architect Mr. W. W. Gwyther, London.

APSE AND ALTAR-PIECE, ST. MARY, MOORFIELDS.

We are able to give a representation of the altar painted between the columns at St. Mary, Moorfields, which has attracted so much attention owing to the closing and demolition of the church.

To say truth, the artistic value of the picture itself is much overrated; what made it remarkable was its effect as creating an apparent vista seen through the order of semi-detached columns at the back of the apse.

The water-colour (a very admirable one) from which our illustration is reproduced, was made a few weeks ago by Mr. A. C. Conrade. He says:—

"The picture is painted on the wall of the apse, and is seen between the columns. The light comes from a skylight behind and above the entablature of the columns and falls on the painting. The effect, from the far end of the church, is extremely striking.

The picture itself is by an Italian named Aglio. It is very bad. The effect is caused by the clever but simple arrangement of the lighting.

I rather think that the sky in the picture may be by another hand, as, in treatment and everything else, it is far beyond the figures, &c., which are beneath criticism. The church was built in 1820, and I think the picture was painted about the same time. The church itself is very bad Classic, barring the beautiful arrangement of the apse, with its picturesque effect of lighting."

CEILING, PRINCE'S RESTAURANT, PICCADILLY.

The ceiling illustrated is painted on a barrel vault in a passage between the restaurant and reception-room. It is executed in Gambier Bamys Medium, and represents the four winds. The ground work of the arabesques in the centre square is coloured Venetian red, and the other arabesques are on a Florentine blue ground. The circles are in full colour and the ground is gilded.

The passage forms a recess in the reception room, and this ceiling carries round the colour of the frieze, the lunette beneath the ceiling forming part of the frieze in that room.

The room was designed by Messrs. Wimperis & Arber, and the frieze and ceiling were executed by Mr. H. C. Brewer.

NORTHERN ARCHITECTURAL ASSOCIATION.

In a short opening address to the Northern Architectural Association on the 15th inst., the President, Mr. William Glover,* said, in speaking of the architectural past and future of Newcastle-on-Tyne:—

"A year has passed since my friend Mr. Rich gave an exhaustive address on the progress of Newcastle to date. Many of the works then in hand are now completed or nearing completion. Amongst these may be mentioned the Asylum by Mr. Dyson, the Young Men's Christian Association premises by Mr. Taylor, the County Hotel by Mr. Graham, the wholesale co-operative stores by Messrs. Oliver, Leeson, & Wood, and amongst the works now in progress may be mentioned the extensive block of buildings in Collingwood-street, also by Messrs. Oliver, Leeson, & Wood, and offices for the Newcastle Breweries Company in the Haymarket by Messrs. S. Oswald & Son. It may not be known to many of our members that the portico at the central station, which was designed by our first President, the late Mr. John Dobson, fifty years ago, has not been finished. The keystones of the arches of the carriageway have still their quarry faces. I have been trying to influence the North-Eastern directors to complete it, and trust it may be done. I sincerely hope that before the close of the century the contemplated scheme for an art gallery worthy of this city will be carried out.

When we look back on the past and see what was accomplished by Richard Grainger we anxiously look for a successor to him with the same broad conceptions, and men of genius and capital to assist him; we might then hope to have Grey-street carried through to the Haymarket, in connexion with which I think a site could be found for the erection of a town-hall, which would rival those in kindred cities, and thus add dignity to the metropolis of the North.

Owing to the energy of our Mayor, Mr. Riley Lord, the public spirit shown and the benevolence of our departed friend and citizen, the late Mr. John Hall, we shall have an infirmary erected worthy of the city, and exceedingly gratifying to us is the fact that our old friend, Mr. Newcombe, has secured the award and the commission to carry out the work. We trust he will have health and energy to see to its completion. . . .

This being the five-hundredth anniversary of the Municipal Charter, we hope that we shall see public spirit raised to carry out some grand and important schemes that will make it a record year for future generations to appreciate and admire. We must not lose sight of the fact that the enormous increase of the population will call for large schemes to meet their requirements.

During the thirty years I have been amongst you there has been no period equal to the last two or three years in developing estates within a three-miles radius of Newcastle, and the enormous number of houses that thave been erected and occupied during that period. There have been about 400 acres laid out, plans passed for 8,000 houses, and about 3,600 houses erected, of which, if you examine the estates, you will find very few unlet. As far as my experience goes, the houses on the estates are let and occupied before they are practically finished.

I think the time has arrived when County Councils or Corporations should have power to force, or by payment to secure, open spaces, and thus give lungs to what must eventually become densely-populated districts. In fact, the giving up of land for open spaces increases the value of dwelling-houses by beautifying the district and giving space for recreation in close proximity to the property."

The remaining portion of the address dealt mainly with points of local interest in regard to the working of the Association; Mr. Glover especially regretting the failure, so far, to carry three projects that he had in view—the provision of a home for the Association, the raising of a library fund, and the provision of prizes for students. He rightly urged that the formation of an architectural library was a matter of great importance.

* Owing to illness, Mr. Glover was not able to be present himself, and the address was read for him by the Hon. Secretary, Mr. A. B. Plummer.

The following elections took place at a recent meeting of the Association:—As *Member*.—Mr. R. B. Dick. As *Associates*.—Mr. W. H. Bourne and Mr. A. P. Tregelles; and as *Students*.—Messrs. C. E. C. Dyson, F. Haswell, J. A. Rainbow, J. W. Reid, and J. Wallace.

ARCHÆOLOGICAL SOCIETIES.

British Archæological Association.—The second meeting of the session of this Association was held at 32, Sackville-street, Piccadilly, on the 15th inst., Mr. Thomas Blashill, Vice-President, in the chair. Mr. A. O. Collard exhibited several interesting objects recently discovered, and read some notes descriptive of them. One of the most curious was the iron point of a broken spearhead, which was found in August last embedded in an inch plank of Honduras mahogany by one of the employés of Messrs. Tims & Sons, boat-builders, of Staines. The plank was 2 ft. wide and 28 ft. long—one of a log already sawn up for use by them for boat-building. The object was first noticed in making a cross-cut with the saw, there being no external evidence whatsoever on the plank to show the iron was buried in it. Oxydised fragments of the wood still adhere tightly to the iron. The head, as found, measures 4½ in. long, 2 in. wide, and about ½ in. in thickness. Other exhibits comprised a spear-head of bronze dredged up from the Thames at Staines, flint implements from Beauvais, a Dutch pocket tinder-box, and a portion of the oak casing—with oak pulley wheels, of a window sash from Hayes Place House, Kent, date

1694.—The Rev. T. I. Woodhouse exhibited a curious collection of articles all found recently and close together in the grounds of the Rectory at Merstham in Surrey. They consisted of Roman pottery and coins and the ashes of a Roman burial, mingled with bits of swords, iron spearheads, and pottery of mediæval date, also a coin of James I. of the Tun Mint. Mr. Fisher exhibited a moidore dated 1797, one of the last coins on which the Kings of England claimed to be Kings of France. A paper by Mr. Cann Hughes, M.A., entitled "Notes of a Ramble in Devon," was read by the editorial secretary, the Rev. H. J. D. Astley.

THE LONDON COUNTY COUNCIL.

THE usual weekly meeting of the London County Council was held on Tuesday at the County Hall, Spring Gardens, Lord Welby, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend the Hackney Vestry 50,000*l.* for electric lighting installation; the Poplar District Board 3,110*l.* for purchase of site for electricity station; St. Olave's District Board 11,000*l.* for paving works; the Battersea Vestry 2,327*l.* for paving works; the Kensington Vestry 19,800*l.* for paving works; St. George (Hanover-square) Vestry 4,585*l.* for the construction of an underground convenience; and the St. Marylebone Guardians 12,000*l.* for works at Southall Schools.

Bills of Quantities.—The General Purposes Committee reported as follows:—

"We have had before us a memorandum from the Fire Brigade Committee asking that the consent of the Council may be obtained to a variation in the present practice with regard to the taking out of quantities. We are informed by the Fire-Brigade Committee that the surveyor who has been asked to take out the quantities for the Redcross-street fire-station states that, having recently received an order to prepare quantities for the Housing Committee, he could not undertake to deliver the quantities for the fire-station by November 30, the day on which they are required by the architect. It may be explained that the matter is one of considerable urgency, as the Council is under notice to give up possession of the Whitecross-street station, for which the new station is to be substituted, at Lady-day, 1901, and it is essential that the architect should be able to report his revised estimate on November 30, in order that the manager of works may be afforded an opportunity before the Council adjourns for the Christmas recess of reporting whether he is or is not satisfied with the architect's estimate. In these circumstances it is proposed by the Fire Brigade Committee to increase the scale of payment to the quantity surveyor from $\frac{7}{8}$ per cent., which would be the rate in accordance with the scale of payment laid down in the Council's present agreement with the quantity surveyors, to $1\frac{1}{4}$ per cent., which would be, we understand, the rate paid by the Admiralty for this work; and on these increased terms of remuneration the quantity surveyor states that he would do his best to complete the quantities by November 30. Morever, he states that under these circumstances he would be prepared to guarantee his quantities. . . . We may add that we have now under consideration the whole question of the present system which has been adopted by the Council with regard to the taking out of quantities, but the recommendation which we now bring before the Council is not to be considered as in any way prejudicing our decision on the general question. We recommend—

(*a*) That Standing Order No. 209, under which the Council accepts the responsibility of the quantities taken out by the quantity surveyors, be suspended; and that the quantity surveyor employed to take out the quantities for the Redcross-street fire-station be made, in this instance, responsible for his quantities.

(*b*) That authority be given for payment, in this instance, to be made at the rate of $1\frac{1}{4}$ per cent. instead of $\frac{7}{8}$ per cent. (the terms of remuneration laid down in the present agreement with the quantity surveyors) to the quantity surveyor referred to; and that the solicitor be instructed to prepare the necessary agreement."

The recommendations were agreed to.

Isle of Dogs Branch Sewer.—The Main Drainage Committee recommended, and it was agreed, that the diversion of the Isle of Dogs branch of the northern low-level sewer between the junction of Manchester-road and East Ferry-road and Yabsley-street, Poplar, be sanctioned; and that so much of the new sewer as will be placed underneath the southern entrance to the West India Docks and other property of the London and India Docks Joint Committee be constructed by the Joint Committee for the sum of 10,549*l.* 12s.

Tramways.—The Highways Committee recommended, and it was agreed, that the Council do seek powers in the London County Tramways Bill, to be promoted in Parliament next session, for the reconstruction, for electrical traction, of the portions of the London County Council Tramways (*a*) between Westminster-bridge-road and Tooting, and (*b*) between Blackfriars-bridge and the tramways junction near the "Horns" public-house at Kennington.

Light Railways.—On the recommendation of the same Committee it was also agreed that the draft, submitted by the Highways Committee, of the Deptford, Shooter's Hill, and Woolwich Light Railways Order be approved; that the Committee be authorised to settle the Orders, in substantially the same form but with the necessary alterations, with regard to the proposed light railways—(*a*) Clapham and Kingston-road, (*b*) New Cross and Eltham, and (*c*) Archway-road, Highgate; and that the said draft orders, when prepared, with such further necessary alterations (if any) as the Committee may think desirable, be deposited with the Light Railway Commissioners.

Improvements.—The Council decided to acquire 112 and 114, Mare-street, and the forecourts of 1, 3, and 9, and part of 7, Tudor-road for the widening of Mare-street, Hackney.

The supplemental estimate of 9,676*l.* 6s. 8d., submitted by the Finance Committee in connexion with the widening of the road at the "Elephant and Castle" estate, Walworth-road, was approved.

Queen Victoria-street Subway.—The Council approved the special maintenance estimate of 902*l.* expended by the Highways Committee for the reconstruction of two lateral passages of the Queen Victoria-street subway, and the execution of other necessary repairs caused by the tunneling in connexion with the construction of the City and Waterloo Railway.

Ventilation, Northern Low-level Sewer.—It was agreed that a brick ventilating shaft be erected on the Council's land at Violet-road, Bromley-by-Bow, and connected with the northern low-level sewer; that the work be carried out without the intervention of a contractor; and that the drawing, specification, and estimate of 1,328*l.* be referred to the manager of works for that purpose.

Tenders.—The Council, on July 11 last, authorised the expenditure of a sum of 1,450*l.* for laying out the ground in front of Aske's School, Hoxton. Tenders were received for the supply of the materials requisite for the purpose.

The Council has now approved of a supplemental estimate for 21*l.* 10s., and accepted the following tenders:—

Internal fencing.—Messrs. McVey, Rennie, & Co., 87*l.* 10s.

Iron-boundary fencing.—Messrs. E. J. Raybould & Co., Limited, 170*l.*

Tar-paving materials.—Messrs. W. E. Constable & Co., Limited—Bottoming, 17s. 9d. per ton; topping, 19s. 9d. per ton; dust, 12s. 6d. per ton; and quartz, 30s. per ton.

The following tenders were also accepted for work at Hughes-fields, Deptford:—

Gymnastic apparatus.—T. Cruwys, 225*l.*

Wrought iron boundary fencing.—McVey, Rennie, & Co., 171*l.*

Wood-paving.—Acme Wood Flooring Company, 11s. 6d. per yard.

Tar-paving materials.—W. E. Constable & Co., Limited—Bottoming, 18s. 6d. per ton; topping, 21s. per ton; dust, 12s. 6d. per ton; and quartz, 30s. per ton.

Places for Cremation.—The Parliamentary Committee reported as follows, the recommendation being agreed to:—

"The Council on March 14 last instructed us to make provision in the General Powers Bill or some other private Bill of the Council in the next session of Parliament to enable the Council and the local authorities under the Metropolitan Burial Acts, to provide places for cremation. Since the date of this resolution the London Government Act has become law, under which the new London Borough Councils can become burial authorities, but the Council is not, and has no power to become, such an authority. We therefore think that the application to Parliament should be confined to powers for burial authorities only. The Home Secretary has informed us, in reply to an inquiry as to whether objection would be taken to the matter being dealt with in the General Powers Bill, that while he would not himself object to private legislation, he thinks that the matter should be dealt with by a public general Act applicable to all burial authorities throughout the country. The Home Secretary adds that if such a Bill were introduced he would be prepared to give it his support. Under these circumstances, we recommend—That the Council's resolution on March 14, 1899, be varied so as to provide for Parliamentary power being sought, by means of a public Bill in the Session of 1900, to enable burial authorities to provide and maintain places for cremation."

Horton Estate.—The Asylums Committee recommended, and it was agreed, that the Council do approve the principle of the provision of a central station for the supply of water and electricity to the asylums to be built on the Horton estate, and that the Asylums Committee be authorised to bring up a scheme for the same.

The Strand Improvement.—Replying to questions, Mr. Shaw-Lefevre, the Chairman of the Improvements Committee, said that the matter of proceeding with the demolition of the houses on the north side of the Strand at Holywell-street was coming before the committee on the following day on the recommendation of the valuer that the Committee should at once proceed to pull down the houses already in the hands of the Council. There was no doubt a great desire on the part of the public that no further delay should take place in widening the Strand at that particular point.

Hotel Shelters.—Colonel the Hon. H. Legge inquired whether the Committee proposed to adhere to their decision not to grant permission for the erection of hotel shelters except in cases where music licences had been granted.

Mr. Waterlow, Chairman of the Building Act Committee, said they had reconsidered the matter, and had decided to modify their rule. In future they would consider, not only whether the premises had a music licence, but also the length of frontage and the number of people using the building.

After the transaction of other business, the Council adjourned.

METROPOLITAN ASYLUMS BOARD.

THE fortnightly meeting of the managers of the Metropolitan Asylum District was held on Saturday last at the County Hall, Spring Gardens, the Chairman, Sir E. H. Galsworthy, presiding.

North-Eastern Hospital—A letter was read from the Local Government Board approving of the plans of the proposed new laundry at the North-Eastern Hospital at St. Anne's-road, Tottenham.

Darenth Asylums.—In July last the managers agreed to the execution of certain outside cementing work at the Darenth Asylums, at a cost of 2,334*l.* The Asylums Committee now reported that additional work of the same nature was required on the north-east angles of nine of the blocks, and the contractor, Mr. J. Bickley, had offered to do this for 5s. a yard, or 6d. less than his contract price for the work now being done. The Committee recommended, and it was agreed, that, subject to the consent of the Local Government Board, Mr. Bickley should be employed to do this extra work for the sum of 422*l.*

Leavesden Asylum.—The managers approved plans for a new mortuary and laboratory attached, for this Asylum, and directed that they should be forwarded to the Local Government Board for approval.

Homes for Female Attendants.—The Asylums Committee reported that their attention had been called to the fact that a large proportion of the female attendants at the asylums left the service after a short stay, and, at Leavesden and Darenth, where this was most noticeable, it was apparently to be accounted for by the fact that the institutions were three miles distant from the nearest railway stations, which were at Watford and Dartford respectively. The committee recommended, as a means of making the service more attractive, that homes for the female attendants should be provided at the asylums at Leavesden and Darenth, and that the Works Committee should be instructed to have plans of the buildings prepared by the Surveyor. Mr. James Brown, chairman of the Works Committee, proposed an amendment to refer the Report back for more detailed information as to the accommodation to be provided, which was seconded by Mr. F. Purchese. The amendment was agreed to.

White Oak School.—The Works Committee reported that they had forwarded to the Local Government Board an estimate of the probable

total cost of this proposed school for ophthalmic children at Swanley, amounting to 133,144*l*. They had informed the Board, however, that the managers would prefer that the issue of an order sanctioning the expenditure should be postponed until a definite tender for the erection of the buildings had been received.

APPLICATIONS UNDER THE LONDON BUILDING ACT, 1894.

At the meeting of the London County Council on Tuesday, the following applications under the London Building Act were considered. Those applications to which consent has been given are granted on certain conditions. Names of applicants are given in brackets. Buildings are new erections unless otherwise stated.

Lines of Frontage.

Fulham.† — A porch in front of a proposed mission-hall on the north side of Rosaline-road, Fulham, next No. 72 (Mr. T. A. Boughton for the Deacons of the Dawes-road Baptist Chapel).—Consent.

Chelsea.—That the application of Messrs. Lethaby & Troup for the Town and Gown Association, Limited (Edinburgh), for an extension of the period within which the erection of buildings upon plots 1 to 4, Cheyne-walk, Chelsea, to abut upon Beaufort-street, was required to be commenced, be granted, upon condition that the buildings referred to be commenced within one year from May 15, 1899.—Agreed.

Hampstead.—One-story shops upon part of the forecourts of Nos. 1 to 13 inclusive, College-crescent, Finchley-road, Hampstead (Messrs. Boehmer & Gibbs, for Mr. A. Sangster).—Consent.

Clapham.—That the application of Messrs. Lee & Pain, for Sir J. Dickson-Poynder, Bart., M.P., for an extension of the periods within which the erection of houses on the south side of Poynder's-road, Clapham Park, Clapham, on part of the grounds of Bygrove House, was required to be commenced and completed, be granted, upon condition that the houses referred to be commenced within three years and completed within four years from December 21, 1897.—Agreed.

Greenwich.—Re-building of the "Waterman's Arms" beer-house, Greenbank-terrace, Woolwich-road, Charlton, to abut upon Anchor-and-Hope-lane (Mr. W. Stewart for Messrs. Mann, Crossman, & Paulin).—Consent.

Hampstead.—That the application of Mr. F. T. Binnington for an extension of the period within which the erection of houses with shops on the west side of South-end-road, Hampstead, and also of houses with bay-windows on the south side of John-street, was required to be commenced, be granted, upon condition that the buildings referred to be commenced within one year from March 21, 1899.—Agreed.

Islington, South.†—An addition at the rear of the "Royal Oak" public-house, Offord-road, Islington, to abut upon Thornhill-road (Mr. W. H. Winder for Mr. J. Dickson).—Consent.

Marylebone, West.—A porch, bay windows, and balconies to proposed residential flats on the west side of Grove End-road, St. John's Wood, upon the Neville Lodge Estate (Messrs. Boehmer & Gibbs for H. Lovatt).—Consent.

Strand. — A conservatory over the north-west porch of Charing Cross Hotel, Strand (Mr. P. E. Fish for the South Eastern Railway Company).—Consent.

Hackney, South.—Two additional stories upon a portion of No. 28, Lower Clapton-road, Hackney, to abut upon Urswick-road (Mr. F. J. Smith for the Board of Guardians of St. Leonard, Shoreditch.—Consent.

Peckham.—An iron and glass roof over the forecourts of Nos. 14, 16, 18, 20, 22, and 24, Inverton-road, Nunhead (Mr. F. A. Powell for Mr. H. Ford).—Refused.

Westminster.†—Buildings at Nos. 143 and 144, Grosvenor-road, Pimlico (Mr. H. O. Cresswell for Messrs. Francis & Co., Limited).—Refused.

Width of Way.

Hammersmith.—An engineering workshop in a yard situated between Queen's-road, Hammersmith, and the river Thames, with a portion of such workshop and the boundary wall in front thereof at less than the prescribed distance from the centre of River-terrace (Messrs. J. and H. Gwynne, Limited). Consent.

Strand.—A generating station on the south-east side of Ganton-street, St. James's, Westminster, at less than the prescribed distance from the centre of Marlborough-row (Mr. C. Stanley Peach for the St. James and Pall Mall Electric Light Company, Limited).—Refused.

Lines of Frontage and Width of Way.

Peckham.—A one-story relief station at the rear of No. 87, Nunhead-lane, to abut upon Albert-road (Mr. A. E. Mullins for the Guardians of St. Giles, Camberwell).—Consent.

Wandsworth.—The re-erection of the "County Arms" public-house, Trinity-road, Wandsworth, to abut upon Alma-terrace (Mr. F. G. Burstow for Messrs. Young & Co., Limited).—Consent.

Dulwich.—Residential flats with bay-windows on the east side of Underhill-road, East Dulwich, at the corner of Balchier-road (Mr. A. Tosh for Mr. H. Hammond).—Refused.

Paddington, South. †—An iron and glass conservatory upon, and an addition to, an existing porch to No. 15, Cambridge-square, Paddington, to abut upon Norfolk-crescent (Mr. F. Wheeler, for Mr. A. Boxall).—Refused.

Lines of Frontage and Construction of Buildings.

Clapham. †—Wood and canvas cover for a motor-car, erected on the forecourt of the Brackens, No. 11, Bolingbroke-grove, Wandsworth (Miss F. Lord).—Consent.

Islington, East.—The retention of a timber gantry erected at Queensland Works, Queensland-road, Islington (Mr. G. Kirby).—Refused.

Chelsea.†—The retention of a temporary wooden shed on the east side of Langton-street, next No. 490B, King's-road, Chelsea (Messrs. Holland & Andrews).—Refused.

Projections and Space at Rear.

St. George, Hanover-square.—A dwelling-house on the south side of Curzon-street, Mayfair, on the site of Curzon Chapel and No. 30, Market-street, with pilasters projecting 4½ in. next Curzon-street, a balcony on the first floor, balconettes on the first and second floors, and a portion of the building extending above the diagonal line directed to be drawn by Section 41 of the Act (Messrs. W. H. Romaine-Walker & Besant for the Duke of Marlborough).—Consent.

Deviation from Certified Plan.

St. George, Hanover-square. — Certain deviations from the plan certified by the District Surveyor, under section 43 of the Act, so far as relates to the proposed re-building of the Coach and Horses public-house, No. 16, Conduit-street, St. George, Hanover-square (Messrs. Gardiner & Theobald for Mr. H. A. Lloyd).—Refused.

Means of Escape from Top of High Buildings.

Holborn.—Means of escape in case of fire, proposed to be provided in pursuance of section 63 of the London Building Act, 1894, on the fifth, sixth, and seventh stories of the Hotel Russell, on the east side of Russell-square, Bloomsbury (the upper surfaces of the floors of which stories are above 60 ft. from the street level), for the persons dwelling or employed therein (Mr. C. Fitzroy Doll for the Directors of the Hotel Russell, Limited).—Consent

Buildings for the Supply of Electricity.

Bow and Bromley.—A deviation from the plans sanctioned on April 25, 1899, for the construction of an electric lighting station and works on a site at the corner of Glaucus-street and Yeo-street, Bromley, so far as relates to the re-arrangement of the buildings next Glaucus-street and Yeo-street (Mr. O. E. Winter, for the Poplar District Board of Works).—Consent.

The recommendations marked † are contrary to the views of the Local Authorities.

The Student's Column.

ROADS: THEIR CONSTRUCTION AND MAINTENANCE.

PART IV.—MAINTENANCE (*continued*).

22. CONDITIONS OF WEAR (*continued*).

In the last chapter we pointed out the difference in the composition of road coatings consolidated by traffic when compared with those which have been subjected to the more modern operation of rolling.

The steam-roller now plays so important a part in road maintenance that it will be useful to examine in greater detail its use and effect. This is the more necessary because, even in the present day, fallacious ideas are commonly held as to its efficiency; and it is not many years since its use was loudly condemned by many surveyors of the older school.

Although the first proposal to use a road-roller for the consolidation of roads was made by a French engineer, in 1787, it was an Englishman, Philip Hutchinson Clay, who in 1817 first patented a roller for this purpose, which, by filling a gravel box fixed upon it, could be adjusted to any desired weight from six to twenty tons. A few years later rollers of this description, drawn by horses, were extensively used in France and Hanover; but the practice does not appear to have been largely adopted in England, although, in 1843, Sir John Burgoyne pointed out the necessity of consolidating macadam roads by this means.

There are many reasons why these early horse-rollers did not come into universal use. The practice was to use them at first as light as possible, filling in any ruts or hollows which might be formed, and afterwards when the surface was sufficiently firm, to increase the weight gradually to its full amount, and to continue the action until no further impression was produced upon the road. But the increase of weight necessitated an increased number of horses. A roller weighing only 6 tons required six horses to pull it, and the damage done by their feet was almost enough to neutralise the advantage gained by rolling, to say nothing of the difficulty in managing a team of this description and the impossibility of securing united action by the horses.

Notwithstanding these disadvantages, the French engineers were not slow to recognise that considerable economy in maintenance was secured by the use of road-rollers, and it was only to be expected that the substitution of steam for horse traction would also emanate from that country. The first patent for a steam road-roller was secured in 1859 by M. Lemoine, of Bordeaux; but it is said that the idea occurred to Mr. W. Clark, an engineer, of Calcutta, as early as 1855, and was suggested by the cruelty inflicted by the bullock rollers then in use in that city. It was not until 1863, however, that, in conjunction with Mr. Batho, he was able to introduce the first steam-roller of British manufacture into Calcutta, where it was used with conspicuous success. In principle this roller was similar to those now in use, and consisted of two driving rollers in front, and a third set in a turntable for steering purposes, behind and overlapping the space between the two front rollers. Shortly afterwards Messrs. Aveling & Porter adapted their form of traction engine to this combination of rollers, and supplied the 30-ton roller which has, since 1867, been used in Liverpool. The most striking lesson to be learnt from the history and evolution of the modern steam-roller, now so universally recognised as an indispensable adjunct to the appliances of all road authorities, both of urban and rural districts, is the extreme slowness with which its beneficial effects came to be fully recognised in this country, in spite of the early efforts of Sir J. F. Burgoyne and others to point out the advantages and economy resulting from its use.

As compared with the early forms of horse-roller, the steam-roller is in every way to be preferred, and more especially in facility of management and economy of tractive force. It costs at least 30 per cent. less than the horse-roller in working expenses, and obviates the disturbing effect of the horses' feet upon the surface. We will now examine the general effect of rolling upon the newly laid metal.

This action is of a two-fold nature which may be briefly described as (1) crowding; (2) crushing; and the main object in view is to secure a maximum of the first with a minimum of the second result. We shall now see how important it is to pay strict attention to the shape of the broken stone. When the roller is first applied to the newly metalled surface the stones are crowded together into as small a space as their shapes will allow, the voids being thus reduced in proportion to the compression of the road-coating. The action commences in the lower layers, and extends upwards, but as the process continues the angles and edges of the stones become slightly crushed, the fine particles thus formed helping to fill up the remaining interstitial space. Hence the more regular and uniform in shape and size the broken stone is when first laid, that is to say, the more nearly cubical the fragments are the less will be the crushing and the more perfect the crowding. It is also obvious that a tough road metal will be less crushed under a heavy weight than one which is soft or brittle. Also the crushing will be less in proportion as internal friction in the road-coating between the individual stones is diminished. This result is effected by using a proper amount of water both before and during the rolling process. A perfect road should contain no voids, and it is the universal recognition of this principle which originally gave rise to the practice, adopted by many engineers, of mixing binding material with the stone in order to fill up the interstitial spaces. This, as we have already shown, it certainly accomplishes, but at the expense of solidity; for if the voids can be filled up by crowding the stones together, the resulting mass must necessarily be more solid than a road which has interstitial spaces

filled with sand or mud. A certain amount of fine detritus must necessarily be produced during the compression caused by the roller, more especially with inferior or badly broken stone; but in no case will this detritus be so large in amount as would be produced by the continual grinding action resulting from the slow and tedious process of consolidation by traffic alone, in which case the loose materials are rolled about instead of settling down into a permanent position of repose, always presenting fresh sides and angles to abrading influences, and rapidly diminishing in size and powers of resistance. While, therefore, it is not contended that rolling produces no crushing at all, it is plain that consolidation can be effected in this manner with the least possible amount of abrasion and with a minimum loss of material. This matter has been clearly expressed in Mr. Paget's "Report on the Economy of Road Maintenance and Horse Draught through Steam Road Rolling," an extract from which may be here quoted in support of the above statements :—

"The main difference between an unrolled and a rolled road, at the outset, is that the first contains nearly three times more empty space than the latter. It is clear that a road cannot be hard and strong until these spaces are filled up. Without the use of rolling this can only be done by the particles ground by the traffic off the edges of the stones, by dirt and foul excrementitious matter. One of the main advantages attending the rolling of roads by steam power consists in the diminished proportion of mud or soluble matter which is then incorporated in the structure of the road surface. If the surface of an ordinary road *that has not been rolled* is broken up and the material washed, it is found that *as much as half of it is soluble matter, mud, dirt, and very fine sand;* the stones having only been thrown loosely upon the road, have lain so long before becoming consolidated by the traffic, and have undergone, in the meantime, such extensive abrasion that the proportion of mud, dirt, and pulverised material in the metalling is increased to that extent, and the stones are really only stuck together by the mud. This accounts for the fact, that although an unrolled macadamised road may, indeed, after long use, have a surface that is pretty good in hard and dry weather, and may offer then a very slight resistance to traction, yet it will quickly become soft and muddy when there is any rain. By the employment, however, of a steam-roller upon the newly-laid metalling of a macadamised road, the stones are rolled in and well bedded at once, and the surface is thus consolidated into a sort of stone felt, capable of resisting most effectually the action of ordinary traffic, and containing the smallest quantity of soluble matter to form mud in wet weather."

To ensure the maximum efficiency of a steam-roller, not only must the broken stone be suitable, but also the shape and weight of the roller itself must be such that it will crowd and compress without crushing the materials. These considerations have also an important influence upon the cost and economy effected by its use. The wider a roller the more quickly is the work accomplished. The bearing surface also being greater, there is less tendency to lateral displacement of the stones. At the same time the width cannot be indefinitely increased without rendering the roller too heavy and unwieldy for convenient use. Also, as a part of the road is generally obliged to be kept open to traffic during rolling, too wide a roller would monopolise too much space. The width should also be regulated by the weight of the roller, which should reach to a ton and a-half or two tons per foot width. The rollers of Messrs. Aveling & Porter show the following proportions as regards weight and width :—

Weight in tons...	8	10	12	15	20
Width in feet ...	4¾	6¼	6½	7¼	8¼

With regard to the weight of steam-rollers, a good deal of misconception exists. Of course, it is possible to use too heavy a roller on weak road metal, but the following figures will show that even the heavier rollers have less influence than ordinary traffic :—"An ordinary loaded two-wheeled cart presses with a weight of 9 cwt. per inch width of tyre, a loaded wagon about 7½ cwt., a 9-ton traction-engine about 3¾ cwt., and a 15-ton steam road-roller about 3½ cwt. So that, as far as the surface of the roadway is concerned, a roller affects it the least of any of the above loads."* Nevertheless, general experience has pointed to the fact that a light roller, from 7 to 10 tons, is best for soft material, such as limestone or Kentish rag. It is also a mistake to use too heavy a roller upon a brittle road metal, such as flints; but hard and tough igneous rocks give a better result with a heavy roller of not less than 15 tons weight. The character of the road bed must also be considered. If this is not hard and unyielding a heavy roller should not be used. The weight is also influenced by gradient, extra power being necessary up hill, as well as the application of brakes down hill. For general use a 6-ton roller would be suitable for gravel roads, 12 tons for macadam; while 15 tons would be heavy enough for the hardest road metal. Owing to the danger of injury to foundations, underground cellars, gas or water mains, it is better to use a roller of medium weight rather than one which is too heavy, even if it necessitates passing over the road a greater number of times. Although theoretically the weight of the roller is distributed over a wide area, in practice this even distribution is very imperfect. The consequence of this is that while the pressure at some points is excessive, other points escape almost entirely. This unequal distribution of the weight is more noticeable in the early stages of rolling than when a fairly level surface is attained; but its existence shows the fallacy of calculating the pressure per inch on the assumption that the weight is uniformly distributed. Take, for example, the effect upon a thin coating of road metal, one stone thick, as used in the repair of an ordinary macadam road. The full pressure in this case is probably exerted upon a few individual stones, and, if a roller of too great a weight is used, the result will be a good deal of crushing of the material.

Unfortunately steam road-rollers, unlike the older forms of horse-rollers, cannot be adjusted in weight to the work which they have to perform. Their cost, also, generally precludes local authorities from purchasing more than one. Otherwise it would be advisable to follow the example of some of the richer districts, and have a series of rollers of different weights—a 15-ton roller for new roads in country districts where there are no underground pipes to damage; one of 10 tons for rolling in repaired patches, and a light roller of 6 tons for steep gradients and light work generally. With regard to the economy in maintenance which is effected by road rolling, the somewhat curious view has often been put forward that if the ordinary traffic will do the work of consolidation it is unnecessary to pay extra cost for this same work to be done in another way. The fallacy of this argument scarcely needs to be pointed out in these days, although there are still certain districts where the enormous wear and tear involved in the slow consolidation of unrolled roads is patiently endured.

We must now pass on to the most effectual method of using the roller. It has already been mentioned that in the construction of a new road the broken stone should be spread in layers, each being well rolled before the next layer is applied. Some road constructors separate each layer of broken stone by rolling in about half an inch of sand between them. Of course, watering must be plentifully done at each rolling. It is best to begin at the sides and work towards the middle, as by this means the contour of the road is better preserved. Any depressions which appear during rolling must be at once filled up with fresh metal, so that the surface is kept even throughout. The number of turns necessary for each strip of roadway will vary considerably in different cases, and will depend upon the weight of the roller, the nature of the materials and the thickness of the coating. It is scarcely possible to lay down any hard and fast rule in this respect. To take an extreme case, the passage of a 10-ton roller forty or fifty times ought to be enough to consolidate almost any materials into a perfectly compact mass. To finish the surface layer, binding material of a suitable description is spread dry with the shovel and uniformly distributed by raking over the metal. It is then watered to such an extent that there is no "licking up" under the action of rolling, which is continued until all the interstices are completely filled up. The process is assisted by adding fresh material, if necessary, and by continual watering and sweeping. After completion, if there be any excess of binding material not incorporated into the road, it is swept off.

It is almost impossible to state the quantity of work which a roller is capable of performing in a day. So much depends upon the nature and thickness of the stones, the gradient, and the number of stoppages and interruptions met with. Probably Messrs. Aveling & Porter's estimate of between 1,000 and 2,000 square yards of newly-laid metal per diem will cover the majority of cases. The work done in rolling is sometimes expressed in ton-miles of roller per cubic yard of broken stone. Thus in Paris about 3½ ton-miles are applied to every cubic yard of metal, and in America about 5 ton-miles.

We will conclude this chapter with a summary of the chief advantages and disadvantages of steam road-rolling.

The advantages are as follows :—

1. Saving in time of construction.
2. Saving in wear and tear both to horses and vehicles.
3. Better construction and consequent economy in maintenance.
4. Saving in road metal, owing to the following considerations :—(*a*) Loose stones are not left to be kicked off the road; (*b*) minimum waste by abrasion during consolidation; (*c*) fewer ruts to hold water and rot the stone; (*d*) thinner coating can be used.
5. Greater hardness and more even surface secured.
6. Weak parts of the road and inferior road metal are soon detected by rolling.
7. Less mud and dirt are incorporated into the road, which therefore remains cleaner in all weathers.
8. Possibility of repairing at all seasons of the year.

On the other hand, the following disadvantages may be noted :—

1. Considerable outlay necessary.
2. Liability of damage to gas and water mains.
3. Interference with traffic and danger of frightening horses.
4. Annoyance from noise and smoke.
5. The difficulty in some cases of conveying water, by which the expense is materially increased.
6. The risk of crushing the metal, or injuring the road foundations by too heavy a roller.

With regard to the first of these disadvantages, the initial cost is ultimately more than covered by its economy. The second objection has been a source of considerable trouble, and even litigation in towns; but the evil can be avoided by care and avoidance of too heavy a roller. The interference with traffic is scarcely worth considering, since it is of far less importance than the prolonged annoyance caused by an unrolled road when under repair. Annoyance from smoke and noise may be considerable in streets, but the rapidity with which the roads are completed reduces this objection to a minimum. The extra expenses incurred in some districts may often be set off against the profits which may arise from subsidiary uses of the roller; and the risk of crushing the road metal or injuring the road bed is easily avoided by care in selecting a roller of suitable weight.

It is seen, therefore, that while all the more serious objections to the use of steam-rollers may be avoided, the advantages gained are so considerable that it is difficult to understand why they were not sooner recognised in this country. It cannot, of course, be denied that there are some very excellent roads which have been constructed and maintained without rolling; but this is scarcely an argument in favour of the older method of consolidation by traffic. However satisfactory such roads may be, it is probable that they would not be less so if the roller were employed; and it is certain that both expense in maintenance and wear and tear of horses and vehicles would be saved by its use.

Questions of cost have not been gone into because it is proposed to deal with this matter separately in a future article.

* Boulnois, "Municipal and Sanitary Engineers' Handbook," p. 67.

BOOKS RECEIVED.

EGYPT EXPLORATION FUND: Archæological Report for 1898-1899. Edited by F. Ll. Griffith. (Kegan Paul & Co.; Bernard Quaritch; Henry Frowde.)

FIRE TESTS WITH PARTITIONS. No. 27 of the Reports of the British Fire Prevention Committee.

THE WORKMEN'S COMPENSATION ACT, 1897: A DIGEST OF CASES TRIED IN THE COURT OF APPEAL.—By William E. Hughes, B.A., and H. Greville Montgomery (43, Essex-street, Strand, W.C.).

GENERAL BUILDING NEWS.

BUILDING IN ABERDEEN.—There has set in a lull in the building trade in the city, which threatens to last for some months. The memorial-stone of Beechgrove Free Church was laid on Tuesday, the 21st inst., and the works on the block in Rosemount-viaduct and other large buildings in progress are well advanced. A considerable number of workmen in the building industry have been thrown out of employment, and not a few granite cutters, plasterers, &c., have already removed to London and elsewhere, and others have made arrangements for following their example. The only large building lately contracted for is the new work in Berryden-road, for the Scottish Combmaking Company, the total cost of which, including machinery, will be about 30,000*l.* The successful offerers are:—Mason, James King; carpenter, Alexander Hall; slaters, Merson & Stewart; plasterers, James Scott & Son; plumber, John Worling; painters, James Garvie & Sons—all of Aberdeen. The architect is Mr. R. G. Wilson, Aberdeen. No intelligence has yet been received in Aberdeen as to the Government contracting for the erection of the new post-office for the city.

WORKMEN'S DWELLINGS, MANCHESTER.—Mr. Law, Local Government Board Inspector, has just held an inquiry at Manchester in regard to a loan of 10,000*l.* which the City Council require for workmen's dwellings. The Council propose to build at Miles Platting forty cottages suitable for persons of the labouring class in order to provide accommodation for the people who will be displaced by the construction of a new street from the junction of Long Millgate and Ashley-lane to Charter-street, in the city. The people occupying the houses to be demolished do not exceed 181 in number, while the new houses, being furnished with three living rooms and three bedrooms, will accommodate six persons in each house, or a total of 240. The land has been obtained on a 999 years' lease from the dean and canons at a ground rent of 3d. per square yard, or a yearly payment of 73*l.* 18. 9d. It is considered that the scheme will be for the public advantage in every way, as the old houses are insanitary, and the new ones will be within easy reach of the centre of the city, being only one mile and six furlongs from Charter-street. Evidence was given in support of the application by Mr. Meade, City Surveyor; Dr. Niven, medical officer of health; and others.

PUBLIC HALL, WEST KIRBY, CHESHIRE.—The West Kirby Public Hall was opened on the 13th inst. The hall buildings occupy a site at the junction of Meol's-drive with Bridge-road, and have a frontage of 148 ft. The principal façade is of red Ruabon brick with brown terra-cotta dressings. The entrance hall is 5 ft. by 21 ft., and is flanked on both sides by corridors 6 ft. 6 in. wide, measures 80 ft. long and 50 ft. wide, while on the first floor are side galleries over the corridors and a large gallery over the entrance hall. The height of the hall from floor to ceiling is 39 ft., and accommodation is provided for 1,200 persons. The stage is 50 ft. by 24 ft., the proscenium opening being 24 ft. wide and 20 ft. high. Flies, gridiron, and other accessories are provided to enable theatrical performances to be given. Cloak-rooms, with lavatories, &c., are provided for ladies and gentlemen, and at the back of the stage are retiring and dressing rooms, lavatories, &c., for the use of the artistes. In conjunction with the above buildings a café is attached, having refreshment-rooms on the ground and first floors, kitchen, serving-rooms, &c., while on the top floor is a room suitable for small meetings, rehearsal, &c., with ante-rooms attached. A feature of this block is a covered verandah, with balcony overhead. The buildings have been designed and carried out under the supervision of Mr. Herbert W. Keef, architect, of Liverpool and Hoylake, and erected by Mr. W. H. Forde, of Birkenhead.

CONVALESCENT HOME, BRISTOL.—The Victoria Jubilee Convalescent Home, at Bristol, was opened by the Queen on the 15th inst. The building, which was originally the Waynflete private school for boys, is situated on the border of Durdham Down, and has been altered according to plans prepared by Mr. W. L. Bernard, the architect of the building. The plaster work was executed by the Adamant Company. Messrs. John Williams & Sons, of Cardiff, carried out the heating, and provided the steam cooking apparatus and laundry plant, including the boilers, engines, and pumps.

WYNDHAM'S THEATRE, CHARING CROSS-ROAD.—The new theatre in Charing Cross-road, erected for Mr. Charles Wyndham, was opened on the 16th inst. The building will accommodate nearly 1,200 persons. The reserved portion comprises twelve private boxes, 157 stalls, 160 dress circle, and 180 family circle seats. The pit is small, but the gallery is large. The theatre being isolated, the exits from the various parts of the house are many and direct. In addition to the staircases, which to the dress circle and balcony are of white marble, there is a lift which runs to each floor and to the roof, where, if the London County Council will permit, Mr. Wyndham proposes to have a winter garden. The scheme of decoration is that of the Louis XVI. period, and the colours used are turquoise blue and cream, relieved by gilding. The proscenium is set in a cream and gold bordering, which is continued along the front of the stage. At the top are allegorical figures and portraits of Sheridan and Goldsmith. The ceiling of the auditorium contains four paintings after Boucher which are illuminated by a ring of concealed electric lights and a central sunlight covered by a crystal pendant and surrounded by eight smaller lights. Round the dress and family circles there are also clusters of electric lights. The architect was Mr. W. G. R. Sprague. The whole of the balcony and dress circle fronts and the proscenium electric light fittings were designed and supplied by Alfred Slatter & Co., of Buckingham-street, Strand. The fittings are of Louis XVI. period, to harmonise with the decoration.

FACTORY, HADLEY, SHROPSHIRE.—A building is in course of erection at Hadley, on the site of the old Castle Ironworks, where Messrs. G. F. Milnes & Co., Limited, of Birkenhead, will manufacture electric tramway and light railway cars, and employment will be provided by the introduction of the new industry for 500 or 600 people. It is estimated that the buildings and machinery will necessitate an expenditure of over 100,000*l.* Thirty acres of land have been purchased by the company, so that, if necessary, it will be possible to extend the workshops and other buildings. The whole of the works will be driven and lighted by electricity. The company have given out contracts for the erection of workmen's dwellings at Hadley. At the entrance to the works will be offices for fifteen to twenty clerks and managers of the various departments, and offices for fifteen draughtsmen. The office-keeper's house will be above. The car-shed will be 500 ft. long, 150 ft. broad, and divided into seven bays, where it will be possible to manufacture 700 or 800 cars per annum. Adjacent to this building will be the log saw-mill, 150 ft. long and 75 ft. broad, with basement for electric motors to drive the saws. A short distance further is the timber store, two floors, and the structure is 200 ft. long and 70 ft. broad. At the end of this building is the house for the steam fire-engine, and the stables will also be placed here. The timber store is protected from the weather, so that the wood in use will be well seasoned before being worked into car bodies. Then there is the wood-working machine shop, which is 250 ft. long and 75 ft. broad. It is two stories high—the lower portion will be occupied by shafting and motors to drive the machinery above. Adjoining the shop is the iron assembly-room, 275 ft. long and 78 ft. broad. This building will be divided up for the lathe, pattern, and drilling machines. Leading out of the room is the iron working machine shop, which will contain the necessary plant for drilling, planing, &c. The smithy is close to, and here there will be four steam hammers, with a large jib crane, capable of lifting two tons, and twelve smithy hearths. Bordering upon the canal will be the boiler-house, with three 350-horse-power boilers, manufactured by Mr. John Thompson, of Wolverhampton. This building is fireproof, and has a chimney at the end about 110 ft. high. Then there is the engine and dynamo-house, near which will be the engineers' rooms, store rooms, and lavatories. A workmen's dining hall, to accommodate about 200, is also in course of erection, and near this will be the iron racks for the storage of rough iron, and beyond will be the general stores—a building about 100 ft. long and 50 ft. broad. The paint shop will be 50 ft. long and 25 ft. broad. Gantries are being provided to bring in all materials in the rough state and transport them to the various portions of the works. Provision has also been made for coal storage. There is a siding into the works from the London and North-Western Railway Company's main line. On the other side of the works is the Shropshire Union Canal, and the company has a private dock. The whole of the buildings are being erected by Messrs. Hughes & Stirling, of Bootle, Liverpool, under the superintendence of Mr. Huon A. Matear, architect, Liverpool.

COTTAGE HOSPITAL, WELLINGBOROUGH, NORTHAMPTONSHIRE.—The foundation stone has just been laid of the Cottage Hospital at Wellingborough. It is situated on the high ground on the Doddington-road. The hospital, which is being erected by Messrs. Brown & Sons, of Wellingborough, from designs of Messrs. Sharman & Archer, is to be built mainly of bricks. The buildings are arranged in two blocks, connected with each other by a corridor 15 ft. in length. The block adjacent to and facing the Doddington-road will be the administrative buildings, consisting of the nurses' dining-room, which can also be used as a committee-room, at the rear of which will be the matron's sitting-room; opposite thereto being the kitchen, scullery, and larder, as well as a disinfecting chamber. Laundry, washhouse, pantry, and cellars, together with other necessary outbuildings are also provided for. Upstairs are five bedrooms for the nurses, matron, and servants, as well as store-room, &c. The hospital proper, which forms the second block, is divided into two large wards by an operating-room. There are also linen and drug stores, separation ward, and bath-room. This building is also entered from the south side by another corridor. The wards have accommodation for six beds each, and are 28 ft. in length and 20 ft. wide. At the rear is a verandah. The interior will be of plaster, with wood block floors. To both buildings hot water will be provided, the heating being by Shorland's patent heating apparatus. Provision has also been made for the erection of a mortuary for post-mortem and other purposes, which will be separate, and will have a separate entrance from the Doddington-road.

NORTH WALES TRAINING COLLEGE, BANGOR.—On the 3rd inst., the Bishop of Bangor held a dedicatory service in the little chapel of the North Wales Training College at Bangor. At the close, the party assembled in the new wing, which was declared open. The buildings are situated on a site overlooking the town of Bangor, the Menai Straits, and Anglesey. The character generally is Gothic, the plan being quadrangular. The building is now practically completed by the addition of the new wing. The college was originally planned by the late Mr. Robert Grierson, who did not live to see it completed, and it has been completed by Mr. Frank Bellis, architect, of Bangor.

FOREIGN.

FRANCE.—The Municipal Council of Paris is organising for next year a Public Congress on Art, to meet at the Hôtel de Ville during the Exhibition. The object is to consider the means of clothing in an artistic form whatever relates to public life. The Council is also organising a technical and administrative exhibition, with a section devoted to each country.——The Union Centrale des Arts Décoratifs has been organising a competition for the best scheme for the fêtes to be held in Paris during the Exhibition, the principal element in it being the decoration for day and night, of part of the Rue Royale and the Place de la Madeleine. The first premium has been awarded to M. Louis Fuschs.——M. Marcel has been commissioned to prepare the plans of the Palais de la Danse which is to be formed within the precincts of the Paris Exhibition——The Academy of Arts of Clermont-Ferrand has adopted the design of M. Teilhard, architect, for a monument to Vercingetorix which it is proposed to erect on the Plateau de Gergovie. The design is a small colonnaded temple in Greek style, surmounted by the Gallic cock with wings outstretched.——The statue of Ferdinand de Lesseps, by M. Frémiet, has just been inaugurated at Port Said.——The death, under tragic circumstances, is announced of the medallist, Daniel Dupuis, whose talent has been universally celebrated since his execution of the new French copper coinage. His wife, in a fit of lunacy, killed him in his sleep, and committed suicide immediately afterwards. Jean Baptiste Daniel Dupuis was born at Blois in 1849. He at first studied painting at the Ecole des Beaux-Arts, but subsequently turned his attention to medalling, became the pupil of Farochon and Lavellier, and obtained the Prix de Rome in 1872. His artistic work includes a great number of plaquettes and medals, notably those for the great Exhibition of 1878, for the Société des Artistes Français, for the Municipal Council of Paris; the one which received the premium in the competition of 1879, representing "La Ville de Paris et La République." He executed also the commemorative medal of the Exhibition of 1889, as well as others. Among his numerous portrait medallions may be mentioned those of Cardinal de Bonnechose, M. Guillaume, M. Ernest Barrias, M. Olivier Merson; and M. Loviot and M. Baller, the architects.

GERMANY.—Some interesting facts have been published as to the extensive nature of the work undertaken by the German Government in connexion with the inland water-ways. No less than 147 were in hand during the year 1898, no work being counted as a separate item in this list unless an expenditure of 1,500*l.* is incurred. Ten of the works during 1898 were in connexion with inland harbours, eighty-six in connexion with rivers, and nine in connexion with canals. The attention that has been paid to inland water-ways throughout Germany is a matter which calls for notice.——Our contemporary the *Centrallblatt der Bauverwaltung* has published a description of the "German Building" for the Paris Exhibition, which will stand on the Seine frontage close to the British building. The building practically represents an old German Town Hall. The design was the result of a limited competition, twelve architects having been invited to send in designs, and these were judged by a Committee of Assessors, including the President of the Prussian Royal Academy, the Directors of the Prussian Public Works Department, and other influential members of the profession. Three designs were selected—one by Professor Thiersch, and two by Herr Radke (a well-known Post Office architect), and the German Emperor, after examining these, finally selected one of those by the latter.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENT.—The office address of Mr. Lewis Angell, C.E., late Engineer and Architect to the County Borough of West Ham, is now Westminster Chambers, 11, Victoria-street, S.W.

ST. JAMES'S THEATRE.—Mr. A. Blomfield Jackson is the architect for the rebuilding, at a contract price of 5,010*l.*, of No. 24, King-street, St. James's, as an enlargement of premises connected with the theatre, and for a re-arrangement of the theatre itself. The St. James's Theatre—known as the Prince's when Bunn was the acting manager—was

originally built in 1835, at a cost of 26,000*l.*, for John Braham, the singer, after Samuel Beazley's designs; the interior, decorated by Crace, was fitted up to resemble that of the theatre in the Palace at Versailles.

CHOIR STALLS, PARISH CHURCH, CHALFONT ST. GILES, BUCKS.—New choir stalls of oak have been erected in this church by Mr. R. Bridgeman, of Lichfield, from designs by Mr. John Oldrid Scott, F.S.A.

STATE OF THE BUILDING TRADES DURING OCTOBER.—The *Labour Gazette* reports that employment in the building trades continued good during the month. The percentage of unemployed union members among carpenters and plumbers at the end of the month was 1·1, compared with 1·3 in September, and 0·9 in October, 1898. The only dispute that began during the month was at Liverpool, where some carpenters and joiners refused to fix prepared joinery unless assured of its purchase from "fair firms." After lasting seven days the dispute was settled, and future orders are to be given to "fair firms."

ABERDEEN HARBOUR AND THE GRANITE TRADE.—The figures applicable to the imports and exports at Aberdeen harbour afford a fair, though necessarily not complete, indication of the extent of the granite industry in the city. During the financial year ended September 30 last, the total amount of rough foreign granite imported into Aberdeen harbour, chiefly from Sweden and Norway, for the ornamental trade, was 10,213 tons, as compared with 12,600 tons for the previous year. The falling off is said to be due not to the decrease in the export monumental trade to the United States but to the Aberdeen granite merchants having had too large stocks. The wholesale value of the rough foreign granite is on the average about 2*l.* per ton, so that last year's imports represent about 20,000*l.* As regards exports, there were despatched during the year 38,984 tons of cubes (causeway stones), contrasted with 35,284 tons the previous year. As causeway stones are now worth, say, from 25s. to 27s. 6d. per ton, the rise is gratifying, and shows that settmakers have been busy. Of pavement and building stones there were shipped from the port 4,633 tons (value, 46,330*l.*), as compared with 4,479 tons in the preceding year. Rubble and chips give a total of 11,180 tons, against 14,616 tons in 1897-8, but the decline is of little consequence, the value of rubble and chips being little more than nominal. Besides the above, 990 tons of road metal were sent away. Polished granite gives a good record, 9,590 tons having been shipped from Aberdeen last financial year, compared with 9,349 tons in the preceding year. As polished granite is worth about 14*l.* per ton on the average, the rise is of consequence, and betokens probably increased use of polished granite fronts in the south. Of granite waste slabs ("adamant") there were exported 2,062 tons, as compared with 2,898 tons last year, the fall being in all likelihood due to other materials of a similar kind at a cheaper rate being on the market. —*Aberdeen Free Press.*

DEVIZES CASTLE.—Mr. C. W. Dempsey, architect, writes to us in reference to the "Note" on Devizes Castle which appeared in our issue of the 4th inst., observing that our remarks would leave the impression that nothing had been done to the Castle since its sale in 1888; whereas his client, the present owner, has laid out several thousand pounds in remodelling and enlarging the building, the work, carried out under Mr. Dempsey's direction, having extended over a period of three years.

LEGAL.

WORKMEN'S COMPENSATION ACT:

A QUESTION OF PARTY WALLS.

AN important case came before Judge Stonor, on Friday last week, at Brompton County Court. The applicant was a labourer named William Mahony, and he claimed damages, under the Workmen's Compensation Act, against his employer, Mr. Richmond Nurse, builder and contractor, Stockwell, London.

Dr. Cooney was counsel for the applicant, and Mr. Hurd, solicitor, appeared for the respondent.

Dr. Cooney explained that the applicant was injured while working for the respondent on some flats in Ashburnham-road, Chelsea. The circumstances regarding the accident were not in dispute between the parties, the sole question for his Honour to decide being whether a party wall, which was more than 30 ft. high, formed part of the building upon which the applicant was working at the time of the accident. The whole of the building on one side of the party wall—marked A on the plan—was above 30 ft. in height; whereas the block on the other side of the party wall—marked B—was below 30 ft., unless the party wall was considered as a portion of B block. He understood that both blocks were being built under one contract.

Mr. Hurd: No, there is a separate contract for A and B.

Dr. Cooney, continuing, said that the men employed by the respondent were sent to work from one block to the other, and the materials were moved backwards and forwards from the blocks as required. He therefore submitted that, as the party wall was above 30 ft. in height, Block B, upon which the accident occurred, was, within the meaning of the Act, above 30 ft. in height.

Mr. Hurd: But it was the party wall of Block A.

The Judge: A party wall is part of both buildings.

Dr. Cooney maintained that the building B was over 30 ft. high, but if his Honour held otherwise, then he (Dr. Cooney) would submit that the accident occurred "on or about" a building that was being constructed and which was at least 30 ft. high. He had looked over various Acts, but found that there were no cases throwing light upon the point. The only Act that seemed to help was the Public Health Act which included the curtilage of a house, wholly or partly erected under statutory authority, in the building.

The Judge: I should say that it would be better to confine yourself to the question of the party wall. What is the amount of the claim?

Mr. Hurd: It is only a small amount—3*l.* 17s.—although the question before the Court is a very important one. My submission is that blocks A and B are separate houses; they have separate entrances, and there is no connection between them. We are building them one at a time, and have a separate contract for each. The party wall in question was built and paid for in connexion with the first block A. The Act speaks of a "building or house," as being synonymous, but as there are two separate houses, with no intercommunication at all, we say that no part of block B was 30 ft. high.

The Judge: But if the party wall, which was 30 ft. high, belongs partly to one block and partly to the other, then part of the second building was 30 ft. high.

Mr. Nurse, the respondent, said that the party wall in question was included in the price of the first block.

Mr. Hurd: Then it seems rather strange to say that the wall is part of the second house.

The Judge: Was the wall left unfinished with openings to receive the second building?

The respondent: Yes, sir.

The Judge: Then it was really a party wall, and belonged—as I said—partly to each building. I find for the plaintiff.

BUILDERS' COSTLY MISTAKE.—ACTION IN THE QUEEN'S BENCH DIVISION.

THE case of Crowshaw *v.* Pritchard and Renwick, which came before Mr. Justice Bigham in the Commercial Court on the 20th inst., raised an important point as to builders' estimates. The action was brought by the plaintiff, the owner of freehold property at Bermondsey, against the defendants, a firm of builders, to recover damages for breach of contract. The facts were shortly these:—In August last the plaintiff, being desirous of having certain building work executed on his premises, caused the following letter to be written by his architect to the defendants. The letter was dated August 22 and ran as follows:—"Our client, Mr. Crowshaw, of No. 116, Fenchurch-street, the freeholder of premises in the occupation of Messrs. Roberts, Adlard, & Co., as above, is about to make additions to the property, and we should be glad to know whether you would be willing to give us a tender in competition for the work. No quantities will be supplied, and our client does not bind himself to accept the lowest or any tender." The specification was sent to the defendants subsequently, and on September 14 the defendants wrote the following letter to the plaintiff, the letter being headed "Estimate":—"Our estimate to carry out the sundry alterations to the above premises according to the drawings and specification amounts to the sum of 1,230*l.*" On the following day the plaintiff wrote that he accepted the defendants' "offer to execute for the sum of 1,230*l.*" the work in question. Later on the defendants wrote that they had made a mistake in their figures, and stating that under the circumstances they must withdraw their estimate. The plaintiff then had the work done by another builder, at a price higher than that given by the defendants, and brought the present action to recover the difference in price as damages for breach of contract, and the question to be determined was whether there was a complete contract binding on the defendants, the defendants contending that their letter of September 14 was not a binding tender, and that the word "estimate" was advisedly used by them in order to avoid a final and binding agreement which would have resulted from the use of such words as "we offer to execute the work."

After hearing the evidence of several builders with a view to showing that this distinction is always observed in the trade,

His Lordship, in giving judgment, said he was clearly of opinion that the defendants' letter of September 14 was an offer to do the work at the price mentioned. It was suggested by the defendants that there was some custom or well-known understanding that a letter in this form was not to be treated as an offer. There was no such custom, and if there was it was contrary to the law. In his opinion both the plaintiff and the defendants intended the letters to constitute a complete and binding contract. It was said that there was no complete contract, because in the specification there was a blank left as to the time within which the work was to be completed. In the ordinary course a subsequent agreement would be come to as to the time, but the absence of any such subsequent agreement would not have the effect of setting aside the already existing contract. The question for decision did not, in fact, depend upon any supposed custom of the trade, but on the language of the letters which had passed between the parties. The defendants had made a mistake and they must abide by the consequence of it. His Lordship then gave judgment for the plaintiff for 250*l.* with costs.

Mr. Herbert Reed, Q.C., and Mr. T. E. Scrutton appeared for the plaintiff; and Mr. English Harrison, Q.C., and Mr. Acland for the defendants.

A LONDON COUNTY COUNCILLOR FINED.

MR. HENRY WARD, civil engineer, Cannon-street, City, a member of the London County Council, and ex-chairman of the Works Committee, was summoned for contravening the Metropolis Local Management Act by erecting a building in Slater-street, Bethnal Green, without having given notice.

The defendant did not appear, and Mr. Margetts, for the Bethnal Green Vestry, said it was impossible that the defendant should not know that it was an infraction of the law to do what he had done—digging out the foundations and erecting a building in the place named.

Evidence was given by Chief Sanitary Inspector Foot as to discovering the building in course of erection, the roof being then on; and Mr. Barrett, surveyor, proved that no notice of the work had been given.

A foreman who came forward said he was responsible. Mr. Corser said the defendant was responsible, and did not attend. He was therefore fined forty shillings and two guineas costs.—*Morning Advertiser.*

A BUILDER'S CLAIM.

IN the Lord Mayor's Court, on the 15th inst., Mr. H. W. Miller, contractor and builders' material merchant, Howley-place, Belvedere-road, Lambeth, sued Mr. Hurst, trading as the Brunswick Rock and Asphalte Company, to recover 43*l.* as damages for negligence.

Mr. Lewis Glyn (instructed by Messrs. Ward, Perks, & Mackay) was counsel for the plaintiff, and Mr. Wildey Wright (instructed by Mr. Courtney) for the defendant.

The plaintiff said he was in occupation of Arch 16, Howley-place—forming part of the approach of Waterloo Bridge—for the purpose of storing building material. In September, 1898, the London County Council instructed the defendant to do certain repairs to the road. In carrying out the work he uncovered the brickwork of the arch and left it without any protection, the consequence being that water percolated through the brickwork. On one occasion he (plaintiff) found about 2 in. of water on the concrete floor of his arch. The walls of the arch were 28 in. thick, and, although the defendant's work was finished in July, the walls of the arch were not dry yet. The sum he now claimed was the amount of damage he had suffered. Soon after the defendant had opened the roadway and taken out the underfilling there was a heavy fall of rain, and no protection was provided over the opening made by the defendant. Mr. Benjamin Woolard, surveyor, gave evidence for the plaintiff, and said that on January 17 he visited the arch, and found the walls very damp, water percolating through. From what he saw he formed the opinion that water must have gathered in the spandrel of the arch. There was no protection against rain, and it was raining the day before he visited the place. The defendant said that while the operations were going on every precaution was taken to prevent water from percolating through the arches. Tarpaulins were provided from time to time as the roadway was opened. Everything possible was done to prevent any damage. He had inspected the arch occupied by the plaintiff, and the opinion he had formed was that it never had been dry. Evidence was given by several witnesses to the effect that everything was done to prevent water from standing, or percolating through the brickwork of the various arches. The jury found a verdict for the defendant.—*City Press.*

MEETINGS.

FRIDAY, NOVEMBER 24.

Architectural Association.—Sir Thos. Wardle, K.B., on "Art as Applied to the Weaving and Printing of Textile Fabrics." 7.30 p.m.

Institution of Mechanical Engineers.—Lord Charles Beresford on "Openings for Mechanical Engineers in China." 8 p.m.

The London School of Economics and Political Science.—Mr. Hirst on "Recent Developments of the Law Relating to Drainage." III. 7 p.m.

Sanitary Institute (Lectures for Sanitary Officers).—Dr. E. W. Hope on "The Hygiene of Byres, Lairs, Cowsheds, and Slaughter-houses, and all places where animals destined for the supply of food are kept, and the Hygiene of Markets, Dairies, and other places where food is stored, prepared, or exposed for sale, and transported." 8 p.m.

Glasgow and West of Scotland Technical College (Architectural Craftsmen's Society).—Discussion on "Glasgow Building Regulations," to be opened by Mr. R. W. Horn. 8 p.m.

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Electricity Works, &c.	Blackpool Corp.	R. C. Quinn, Town Hall	Nov. 28
National Schools, Heytesbury, Wilts.	.....	W. H. Hardick, Archt. High-st Warminster	do.
Villa, &c. West End, Cupar, N.B.	Mrs. Williamson	W. Birrell, Archt. Crossgate, Cupar	do.
*Kerbing and Tarpaving Beecroft-rd. Brockley	Lewisham B. of W.	Surv.'s Dept. Town Hall, Catford, S.E.	do.
*Kerbing and Tarpaving Brockley-rd. (part of)	do.	do.	do.
*Kerbing and Tarpaving Hilly Fields Crescent	do.	do.	do.
*Making-up Streets	Cnty. Boro. of W. Ham	J. G. Morley, Town Hall, W. Ham, E.	do.
Workhouse Laundry	Lanchester Union	G. T. Wilson, Archt. 121, Durham-rd. Blackhill, co. Durham	Nov. 29
Church, St. Stephen, Docks, Cardiff	.....	E. M. Bruce-Vaughan, Archt. Cardiff	do.
*Erection of Mortuary	Harrow-on-Hill U.D.C.	Edgar Lines, High-street, Harrow	do.
School, Carleton	.....	Swire Hartley, Poulton-rd. Carleton	Nov. 30
Lodge, Baildon	.....	S. Jackson & Son, Archt. Tanfield Chambers, Bradford	do.
Hospital	Barry (Glam.) U.D.C.	J. C. Pardoe, C.E. Holton-rd. Barry	do.
House, Braunton, Devon	.....	Ellis, Pon & Bowden, Surv. Bedford Chambers, Exeter	do.
Retaining Wall, South Ford-road	Dartmouth U.D.C.	T. O. Veale, Boro Surv. Town Hall	do.
Laboratory	Eastbourne Corp.	W. C. Field, Archt. Town Hall	do.
*Erection of Paint Shop	Midland Rly.	Co.'s Archt. Cavendish House, Derby	Dec. 1
*Erection of Vagrant Wards, &c.	Alresford Union	The Workhouse, Alresford	do.
Additions to Four Houses, Churchst.-st. Egremont	.....	J. Kinney, Little Mill Farm, Egremont, Cumld.	do.
Brick Kiln and Chimney Stack, Idle, Bradford	.....	W. J. Beall, Surv. 23, Bank-st Bradford	do.
Warehouse, &c. Rydd Works, Keighley	Summerscales & Sons, Ltd.	W. & J. B. Bailey, Archt. 1, Scott-st. Keighley	do.
Culvert, Hopgrove, near York	.....	W. Stead, C.E. Northallerton	Dec. 2
Two Cottages, Bossington, Hants	W. H. Deverell	T. Stopher, Archt. 57, High-st. Winchester	do.
Additions to Sanitorium, Bekesbourne, Canterbury	Bridge R.D.C.	W. J. Jennings, Archt. 4, St. Margaret's-st. Canterbury	do.
Hospital, Ebbw Vale, Mon.	.....	Lansdowne & Griggs, Archt Newport, Mon.	do.
*Construction of a Portion of New Electricity Supply Station	Whitechapel District B. of W.	W. Jameson, Bd. of Wks. Offices, 15, Gt. Alie-st. Whitechapel	Dec. 4
Two Villas, Salterton-road, Exmouth	.....	E. E. Ellis, Archt. Exmouth	do.
School, Victory-rd.	Horsham Sch. Bd.	W. Buck, North-street, Horsham	do.
*Construction of Certain Works of Sewerage	Hendon U.D.C.	S.S. Grimley, Public Offices, The Burroughs, Hendon, N.W.	do.
*Supply of Dust Vans	St. Mary Vestry, Islington	J. P. Barber, Vestry Hall, Upper-st. Islington, N.	do.
Additions to Infirmary, Cardiff	.....	E. Seward, Archt. Cardiff	Dec. 6
*Making-up and Paving Althea-st.	Vestry of Fulham	C. Botterill, Town Hall, Walham Green	do.
*Supply of New and Purchase of Old Stores	Gt. N. Railways	Stores Dept. Gt. Northern Rly. Doncaster	do.

CONTRACTS—*Continued.*

Nature of Work or Materials.	By whom Required.	Forms of Tender, &c. Supplied by	Tenders to be delivered.
Two Villas, Chesnut Hill, Keswick	G. P. Abraham	T. Hodgin, 27, Station-rd. Keswick	Dec. 7
*Erection of School, &c.	Trustees of Bible Christian Church	2, The Pavement, Brownhill-rd. Hither Green	Dec. 9
*Erection of the Superstructure of Three Cottages	Edmonton U.D.C.	G. E. Eachus, Town Hall, Lower Edmonton, N.	Dec. 11
Bridge Works, Bridge-st. Bacup	Lancs. C.C.	Bridgemaster, County Offices, Preston	do.
*Erection of Infirmary	West Ham Union	F. J. Sturdy, 44, Finsbury-pavement, E.C.	Dec. 13
*Erection of New College	Wigan Technical College	Briggs & Wolstenholme, Richmond-terrace, Blackburn	Dec. 14
*Execution of Works of Drainage, &c	St. Olave's Union	Newman & Newman, 31, Tooley-st. S.E.	do.
*Foundations and Works, Victoria and Albert Museum	H.M. Office of Works	H. M. Office of Works, Storey's Gate, S.W.	Dec. 15
*Founoations and Works, Royal College of Science	do.	do.	do.
*Providing and Laying Water Mains, &c.	Langport R.D.C.	Bailey, Denton, Son, & Lawford, 9, Bridge-street, Westminster	do.
*Erection of Hospital	Abingdon Jnt. Hos. Bd.	J. G. T. West, Abingdon	Dec. 16
*Erection of Infectious Diseases Hospital	I. of Thanet Jt. Hospt Bd.	Langham & Osborne, 70, High-st. Ramsgate	Dec. 18
School Buildings, West-st. and Copse-rd.	Fleetwood (Lancs.) Sch. Bd.	W. H. Haworth, Archt. 15, Mawdsley-st. Bolton	do.
Additions to School, Leighton-rd. Tranmere	Birkenhead Corp.	C. Brownridge, C.E. Town Hall, Birkenhead	Dec. 19
*Construction of Reservoir	Llanelly U.D.C.	J. H. Barnes, 30, G. George-st. Westminster	Jan. 2
Additions to Business Premises, Castleford	E. Millar	Garside & Pennington, Archt. Castleford	No date
Cottages, Cloughton, Scarborough	H. E. Donner	C. Edeson, Archt 25, Huntrias-row, Scarborough	do.
Schools, Humber-rd. Beeston, Notts	.....	R. Clarke, Archt. Prudential-bldgs. Nottingham	do.
House, &c. Hemingfield, Yorks	.....	J. Robinson, Wombwell, Barnsley	do.
Additions to British Schools, Horwich, Lancs.	.....	E. W. Dyson, C.E. 17, Leelane, Horwich	do.
*Supply of Steel Girders, &c.	Chesterfield Sch. Bd.	Tiltman & Jackson, Knifesmith Gate, Chesterfield	do.
*Heating Apparatus	do.	do.	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in.
*Building Inspector	Bor. of Longton	2*l.* per week	Nov. 28
*Clerk of Works	Bournemouth Tech. Sch.	.....	Nov. 30
*Quantity Surveyor	Bro of Shoreditch	.....	Dec. 4
*Timeke-per and Material Clerk	Battersea Vestry	35*s.* per week	Dec. 5
*Storekeeper	St. Mary Battersea	120*l.* per annum	Dec. 7
*Engineering Assistant	St. Mary Vestry, Islington	3*l.* 3*s.* per week	do.
*Clerk of Works	Barking Sch. Bd.	3*l.* 3*s.* per week	No date

Those marked with an asterisk (*) are advertised in this Number. ***Competitions, p. —.*** ***Contracts, pp. iv. vi. viii. x. & xix.*** ***Public Appointments, pp. xvii. & xix.***

SATURDAY, NOVEMBER 25.

London and Provincial Builders' Foremen's Association (Memorial Hall, Farringdon-street, E.C.).—Mr. A. S. E. Ackermann, A.M.Inst.C.E., on "Thoroughness." 8.30 p.m.

MONDAY, NOVEMBER 27.

Surveyors' Institution.—Mr. P. E. Pilditch on "Party Walls under the London Building Act, 1894." 8 p.m.

Society of Arts (Cantor Lectures).—Mr. H. H. Cunynghame on "Enamelling upon Metals." II. 8 p.m.

University College, Gower-street.—Dr. S. Rideal on "Sewage and its Purification." IV. 5.30 p.m.

TUESDAY, NOVEMBER 28.

Institution of Civil Engineers.—(1) Papers to be further discussed:—(*a*) "The Waterloo and City Railway," by Mr. H. H. Dalrymple-Hay; (*b*) "The Electrical Equipment of the Waterloo and City Railway," by Mr. Bernard M. Jenkin. (2, time permitting) Mr. C. Newton Russell on "Combined Refuse-Destructors and Power-Plants." 8 p.m.

WEDNESDAY, NOVEMBER 29.

Northern Architectural Association.—Mr. J. P. Allen on "Expanded Metal." 7.30 p.m.

Society of Arts.—Mr. Allan Wyon on "The Great Seals of England." 8 p.m.

THURSDAY, NOVEMBER 30.

Institution of Civil Engineers (Students' Meeting).—Sir Douglas Fox (President) will give a short Address to the Students, after which a paper will be read on "Bridges for Light Railways," by Mr. L. H. Rugg. 8 p.m.

FRIDAY, DECEMBER 1.

Architectural Association Discussion Section.—Mr. F. C. Eden on "Church Furniture." 7 p.m.

The London School of Economics and Political Science.—Mr. Hirst on "Recent Developments of the Law Relating to Drainage." IV. 7 p.m.

Institution of Junior Engineers.—Mr. G. D. Sweetman on "Natural Methods for the Purification of Water-carried Sewage." 8 p.m.

SATURDAY, DECEMBER 2.

Institution of Junior Engineers.—Visit to the Sewage Disposal Works of the Sutton Urban District Council.

Dundee Institute of Architecture.—Mr. R. Gibson, C.E., on "Electricity in Building Work," with experiments. 7 p.m.

RECENT PATENTS:

ACCEPTED SPECIFICATIONS.

Open to Opposition until January 15.

[1898.] 23,376, Buzzard, Hoists. 23,437, Bourgoin, Brazing or Soldering for Articles of Aluminium and its Alloys. 23,548, Simpson, Turret Lathes, &c. 23,562, Hutton, Utilisation of Precipitated Sewage Sludge. 23,754, Cooper, for Fastening Handles in Brushes, &c. 24,104, Wilson & Cater, Apparatus Connected with the Charge and Discharge of Storage Cells in Systems of Electrical Distribution. 24,133, Hirst & Bevis, Open or Enclosed Electrical Arc Lamp. 24,188, Villaret & Wahlen, Drying Apparatus for Bricks, &c. 26,014, McQueen & Barker, Drawing Frames. 26,147, Ilsley, Tool Grinding Appliance. 26,284, Lee, Disinfecting Apparatus for Water-closets, &c. 26,403, Day, Waste Water-closets, &c. 26,434, Webster & French, Drying White Lead. 27,173, Rowe, Bricks. 27,181, Reed & Knight, Stoppers for Stoneware Pipes, Gullies, Traps, and Junctions. 27,396, Wellard, Ball and Float Valves. [1899.] 423, Kingzett, Apparatus for Testing or Disinfecting Drains. 450, Prior & Yates, Gas Cooking Stoves. 537, Highfield, Pressure Regulating Apparatus for Electrical Mains used chiefly with Storage Batteries. 636, Beck, and 10,410, Tabard, Acetylene Gas Generators. 653, Richmond & Co. and Richmond, Burners for Gas Fires, Gas Cooking Apparatus, &c. 655-6, Cox, Electrical Switches, and Locking and Releasing Device for them. 877, Shanks, Water-closet Apparatus. 1,178, Ashworth, Attachment of Knobs to their Spindles, &c. 2,052, Reid, Pumps. 2,748, Soc. d'Etude des Piles Electriques, Primary Electrical Batteries. 3,969, Pickup, Fastening Devices for Casements, Sashes, Doors, &c. 5,943, Stampacchia, Manufacture of Hollow Ware. 6,306, Cerebotani, Instrument for Drawing Curves. 11,957, Turski, Making Oil Colours. 12,353, Jones & Pocklington, Conduits for Electrical Conductors. 13,125, Martin & Colville, Registering the Output of Electrical Light and Power Stations, &c. 14,546, Ham, Coupling or Connecting Lead, or Composition Pipes to Pipes, Taps, &c., and for Stopping Pipes. 14,698, Gerdes, Acetylene Gas Lamps. 15,336, Bond, Safety Acetylene Lamps. 16,140, Allgemeine Elektricitäts G., Electrical Resistances and Heating Bodies Composed of Metallic Oxides. 16,623, Manning, Skylights and Windows. 16,747, Gracey & Gfeller, Control of the Descent of Lifts and Vehicles on Inclined Railways. 17,168, Hartmann, Hand Saw for Sawing Metals. 17,503, Murphy, Clutches. 18,088, Nüesch & Nüesch, Mechanism for Preventing Freezing in Water Pipes. 18,407, Edwards, Clips for Fastening and Fixing Pipes to Walls. 18,819, Heinz & Heinz, Blow-pipe Lamps. 19,192, Allison & English, Drying Bricks, Earthenware, Cement, Slurry, &c., before Burning. 19,287, Fiske, Manufacture of Bricks. 19,328, Woodhead, Cramps. 19,619, Burke, Laminated Armatures for Dynamo-Electrical Machines. 19,753, Milne, Sprocket Gear and Conveying or Elevating Apparatus. 19,845, Linser, Automatical Sprinkling Device for Fire Extinction. 19,861, Smith & Gilbert, Flushing Mechanism for Water-closets, &c. 20,005, Mant & Hahn, Split Pulley. 20,115, Dravers, Grinding Mills. 20,139, Catkosinski & Weintraub, Bricks, Tiles, artificial Stone, &c. 20,199, Baxter, Stone-breaking and Ore Crushing Machines. 20,257, Kernchen, Chimney Tops. 20,342, Higgins, Suction Dredges. 20,391, Lord, Brake Mechanism for Railway Waggons and Trucks.

ABSTRACTS OF PATENTED INVENTIONS.

16,022.—BRICKS AND SLABS: *G. A. Kiefer & W. T. Herbst.*—Sulphate of lime is partly produced by adding sulphuric acid to powdered hydraulic lime suspended in water, a filling material, such as sawdust, chaff, ashes, sand, and so on, is added, and a plastic mass is formed by mixing well-burned gypsum with the ingredients; the composition, it is stated, will set in moulds without pressure and harden when dried in the air.

16,042-3.—JOINTING FOR PIPES, MAINS, &c: *K. E. Rosenthal & J. Bilwiller.*—The invention lies in impregnating the packing material with certain other materials that will combine with any leakage and produce a deposit of increased bulk; for instance, in the case of gases which contain sulphur compounds, a solution of iron chloride may be used for impregnating the packing. For the sides or walls of gas reservoirs, pipes, &c., the same principle is applied—for example, if an alcoholic solution of ferric chloride be used, a mixture of ferric sulphide and ammonium chloride will be formed by the sulphuretted hydrogen and ammonia in the gas, and will serve to stop the pores and prevent leakage of gas.

16,076.—PORTABLE BUILDINGS: *R. R. Spiers.*—Foundation frames, fastened together with bolts and nuts, are laid upon levelled ground or upon stones or blocks; floor-sections are fastened to the frames by screw nails, being also fitted with lifting-rings; the wall-frames are secured together by bolts, and the joints are rendered weather-tight by means of tongues; the walls and roofs are tied together with light iron tie-rods and king-bolts, in which are eyes for the connecting bolts. When the building is taken down its foundation frames and floor sections are converted into packing cases. The invention is described as being especially suitable for hospitals, military huts, barracks, &c.

16,079.—INCANDESCENT GAS STOVES: *R. Clayton & T. Ward.*—The grate's front part is cast in one piece, and is fastened on to the bottom of the casing with screws, so that it may be readily removed for the lifting out of the back-plate and of the asbestos filling.

16,090.—ACETYLENE GAS: *H. Dant.*—The reservoir is placed within a cistern with which it communicates by means of holes in its lower portion. On a cap which closes its top rest the air-tight carbide cylinders and the washing chamber—the latter being joined to the interior by a bent pipe; each of the cylinders has a cock for admitting water and allowing gas to escape. When water is put into the cistern it rises to the cocks and first flows into the lowest cylinder, when all the gas is produced from the carbide in that cylinder, the water fills it and then flows into the remaining cylinders in succession.

16,118.—LATCH LOCKS: *H. L. Hammer.*—The inventor's object is to provide for disconnecting the arm on the spindle which moves the latch from the spindle, and for so rendering it incapable of undoing the latch. A toothed rack that is engaged by a pinion upon the key's end moves a bolt which slides in the arm of the spindle and enters a hole in the spindle. The key may be inserted from either

side of the lock, and the friction of a rubber block holds the bolt when withdrawn.

16,167.—Disconnectible Pipe Couplings: *A. Lingard & H. Peace.*—Between the ferrule and the end caps are enclosed compressible packing pieces or elastic rings. In other forms of the joint only one large elastic ring is used, or the end pieces are screwed externally and drawn together by nuts and bolts. This form of joint may serve for joining a pipe to the bib of a water or similar tap.

16,173.—Manufacture of Portland Cement: *G. A. des Ciments et Plâtres de Vilvorde.*—To the charges of fuel with the natural and artificial cement materials in the kiln is added sodium chloride, in order to burn the cement completely and improve its quality, and to economise fuel.

16,184.—Burning Portland Cement: *C. Schneider & V. F. L. Smidth.*—The burned material drops into a cooling chamber, fixed beneath the calcining chamber, and communicating with an air space around the calcining chamber, the air space being formed so as to join the flue by means of controlling valves; loose bars resting upon supports serve as a grate, through which the calcined material is drawn.

16,187.—Structures of Concrete and "Expanded Metal": *W. Gürtler.*—A lattice-work or skeleton of metal is embedded in or covered with plaster, cement, concrete, &c., the flanges of a girder made of two flanged sheets of "expanded metal" rivetted together, are formed of separate strips of sheet metal bent to a T-, U-, or angle-shape; for concrete vaults, ceilings, or arches plain or curved sheets of the expanded metal are used, with plain, flanged, or angled edges; for gutters, channels, or water pipes, or for ventilation purposes, the sections or skeletons are covered with a hard cement; various other applications of the contrivance are specified.

16,359.—Spigot and Socket, and Butt and Flange Joints: *E. Walker.*—In order to prevent leakage through the lining of cold-lined, leaden, or composite pipes, a flanged ferrule is fastened to the pipe and the lining is flanged over the ferrule, the two flanges when pressed together by a nut form a butt joint; by another method the lining and covering are expanded between the coned and flared ends of the junction piece and ferrule.

16,417.—Kilns for Firing Bricks, &c.: *H. Burridge.*—In the dividing walls of the chambers, set in a row, are inlet and outlet openings, and beneath the floor are two flues (or a double main flue divided) that have openings at each end and communicate with a shaft. Two separated rows of chambers may be arranged lengthwise, on either side of a central chimney shaft.

16,433.—Wood Planing and Moulding: *N. N. Haigh.*—The object of the contrivance is to effect an adjustment of the height of the front plate of a planing machine with rotary cutters by extending the front plate slides upon an inclined surface, the extension being raised or lowered upon the slide—which may also be vertical—by means of a screw worked by a hand-wheel and bevel gear.

16,449.—Conduits for Electrical Conductors: *F. D. Kenney & W. V. Morten.*—The conduits consist of lengths of iron pipe, having a flat section, which are fixed together with air-tight joints; portions of the pipe, at intervals, are fashioned thicker, and have a side opening closed with a cover and an air-tight joint; doors afford access to the cables, which are insulated from one another with paper, and are passed out through insulating plugs, which are screwed into the pipes; to repel moisture the conduit's interior is kept at a pressure rather higher than that of atmospherical air, by pumping air into it.

16,546.—Roof Slating: *H. Boddy.*—The slates, of square, rectangular, or diamond shapes, are set diagonal-wise, so that the lower edge of one slate rests against the upper edge of the next slate in its row, the butt joints between the slates in every row being covered by the slates in the row next above it, with the result that a less number of slates is needed for any given area of roof.

16,476.—Drawing Boards: *T. R. Ablett.*—Pins upon detachable vertical boards fit into sockets made in the drawing boards, and in the former boards are cut grooves for card supports upon which models or other objects may be put. The vertical boards may be turned about, direction lines being marked for placing a number of them in the same relative position.

16,489.—Artificial Stone: *W. Olsshewsky.*—A mixture of sand and of lime, thoroughly slaked, but without excess of moisture, is steam-heated to produce lime-sand-stone; in order to harden the stone, it is packed upon the grating of a truck, whilst the lime to be slaked is put in a box underneath the grating; one truck (or more) is run into a chamber, which is then closed, and low-pressure steam is admitted; the steam condenses upon the stone and, passing through the grating, slakes the lime; then high-pressure steam is admitted to harden the stone.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

November 8.—By Edwin Evans (at Clapham Junction).

Acton.—9, Shalimar-ter., u.t. 86 yrs., g.r. 8*l.* 10s., r. 36*l.*	£295
Battersea.—38, Savona-st., f.	295
33 to 39 (odd), Ingelow-rd., u.t. 78 yrs., g.r. 19*l.* 14s.	1,280
67 and 69, Heaver-rd., u.t. 78 yrs., g.r. 10*l.*	445
143 and 145, Maysoule-rd., u.t. 79 yrs., g.r. 10*l.*	450
479, Battersea Park-rd., u.t. 66 yrs., g.r. 9*l.*	375
11, Shelgate-rd., u.t. 68 yrs., g.r. 5*l.* 10s.	270
64, Wakehurst-rd., u.t. 82 yrs., g.r. 6*l.* 10s.	305
15, Chetwode-rd., u.t. 80 yrs., g.r. 6*l.* 10s.	270
53, Margravine-rd., u.t. 91 yrs., g.r. 5*l.*	310
Streatham.—3, 4, and 5, Blegborough-st., u.t. 98 yrs., g.r. 16*l.* 10s.	690
1 to 33 (odd), Cunliffe-st., u.t. 98 yrs., g.r. 93*l.* 10s.	3,910
8 to 14, Fernthorpe-ter., u.t. 98 yrs., g.r. 38*l.* 10s.	1,610

November 9.—By Wilkinson, Son, & Welch (at Brighton).

Brighton.—29, New Steine, f.	1,100
37, Montpelier-cres., f.	1,200

November 10.—By E. & S. Smith.

Clerkenwell.—18, Great Percy-st., u.t. 20 yrs., g.r. 4*l.*, r. 60*l.*	385
Camden Town.—4, St. Paul's-rd., u.t. 43 yrs., g.r. 7*l.*, r. 45*l.*	400

November 13.—By J. H. Bethell (at East Ham).

East Ham.—St. John's-rd., &c., 81 plots of freehold building land (in lots).	5,495

November 14.—By Drivers (at Holloway).

Tottenham.—St. Ann's-rd., f.g.r.'s 69*l.* 10s., reversion in 70 yrs.	£1,550
Seven Sisters'-rd., f.g.r.'s 63*l.*, reversion in 70 yrs.	1,575
Finsbury Park.—Eade-rd., f.g.r.'s 36*l.* 15s., reversion in 86 yrs.	925
Kilburn.—51, Salusbury-rd., u.t. 80 yrs., g.r. 11*l.* 11s., r. 50*l.*	760

By E. Gibbs & Co.

Camberwell.—41, 42, and 43, Camberwell-green, f., r. 140*l.*	2,300
Whitechapel.—Hungerford-st., f.g r. 3*l.*, reversion in 24 yrs.	120

By William Houghton (at Walthamstow).

Walthamstow.—Borwick-av., 24 plots of building land, f. (in lots)	2,694

November 15.—By Harold Griffin.

Battersea.—Winstanley-rd., f.g.r. 6*l.*, reversion in 79 yrs.	150
70, Kilton-st., u.t. 68 yrs., g.r. 3*l.* 10s.	220
14 and 16, Granfield-st., u.t. 80 yrs., g.r. 9*l.*	400
Putney.—Disraeli-rd., f.g.r. 7*l.*, reversion in 79 yrs.	190

By Herring, Son, & Daw.

Leyton.—14 to 32 (even), 38 and 40, Leyton Park-rd., u.t. 78½ yrs., g.r. 54*l.*, r. 311*l.*	2,450
14 to 34 (even), 76 and 78, St. George's-rd., u.t. 78½ yrs., g.r. 56*l.* 11s. 4d., r. 305*l.*	2,280

By Swan Woodcock (at Stratford).

Upton Park.—1 to 5, Charlotte-ter., f.	820
West Ham.—25, Steele-rd., f.	250
Stratford.—51, 53, and 55, Chapel-st., f.	840
Leyton.—Newport-rd., a plot of land, f.	250
188, 190, and 196, Grove-rd., f., r. 84*l.*	1,425

By Alfred Richards (at Tottenham).

Tottenham.—Broad-la., seven plots of land, f.	304
371, Seven Sisters-rd., u.t. 97 yrs., g.r. 24*l.*, r. 60*l.*	410
67, Chesnut-rd., f.	295
18 and 20, Northumberland-gr., u.t. 51 yrs., g.r. 9*l.* 7s. 8d.	290

By Messrs. Balls (at Braintree).

Halstead, Essex.—Gladfeu Hall Estate, 195 a. 2 r. 31 p., f.	2,100

November 16.—By H. J. Bliss & Sons.

Canning Town.—24, Beaconsfield-rd., f.	250
Peckham.—Stanton-st., Bridge Wharf, u.t. 37 yrs., g.r. 7*l.*, r. 35*l.*	275
Stratford.—19, 20, 21, and 22, Maryland-st., u.t. 66 yrs., g.r. 15*l.*	450
Edgware-rd.—North-pl., i.g.r. 25*l.* u.t. 22 yrs., g.r. nil.	290

By H. J. Bromley.

Marylebone.—82, 82a, and 84, Great Titchfield-st., 28 and 29, Foley-st., u.t. 64 yrs., g.r. 90*l.*, e.r. 1,081*l.* 11s.	8,000

By C. C. & T. Moore.

Lambeth.—108, York-rd., and 4, 5, and 6, Chicheley-st., u.t. 25 yrs., g.r. 64*l.*	1,000
Limehouse.—7 to 17 (odd), 14 to 30 (even), Carr-st., and 2, Dupont-st., u.t. 14 yrs., g.r. 7*l.* 14s.	650
Old Ford.—339, Old Ford-rd., u.t. 54¼ yrs., g.r. 3*l.*, r. 35*l.*	320
Stratford.—3, West Ham-lane, u.t. 67 yrs., g.r. 16*l.*, r. 50*l.*	560
Stepney.—5, Grosvenor-st., c.	425

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; e.r. for estimated rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent yd. for yard, &c.

PRICES CURRENT OF MATERIALS:

WOOD.*

Per Petersburg standard hundred.

	£ s. d.	£ s. d.
White Sea: first yellow deals	17 15 0	18 15 0
Second do.	14 0 0	15 10 0
Third do.	12 5 0	13 10 0
Battens, 40s., 30s., and 15s. less respectively.		
Petersburg: first yellow deals	14 10 0	17 0 0
Second do.	11 10 0	13 0 0
Battens, 30s. and 20s. less respectively.		
Petersburg, white deals	10 10 0	12 10 0
Do. white battens	9 0 0	10 0 0
Riga, white deals	9 0 0	10 0 0
Swedish mixed yellow deals	14 0 0	17 10 0
Third do.	13 0 0	15 10 0
Fourth do.	11 10 0	12 10 0
Fifth do.	10 10 0	11 10 0
Battens, 30s., 20s., and 10s. less respectively.		
Whitewood, 10 to 20 per cent. less.		
Finnish unsorted yellow deals	10 10 0	11 0 0
Battens, 10s. and 5s. less respectively.		
Whitewood, 5 to 10 per cent. less.		
Norwegian second yellow battens	8 0 0	8 10 0
Third do.	7 10 0	8 0 0
Fourth do.	7 0 0	7 10 0
Whitewood, 10s. less.		
Danzig, Crown Deck deals, per 40 ft. 3 in.	0 15 0	1 5 0
Brack	0 12 0	1 0 0
St. Lawrence Pine deals, &c., per P.S.H.:—		
1st, Bright and Dry, regular sizes	20 0 0	27 0 0
" " oddments	13 0 0	20 0 0
2nd " regular sizes	15 0 0	17 10 0
" " oddments	10 0 0	14 0 0
3rd " regular sizes	9 0 0	11 0 0
" " oddments	7 10 0	9 10 0
4th " regular sizes	8 0 0	9 0 0
" " oddments	7 0 0	8 10 0
St. Lawrence Spruce deals, &c.		
First, regular sizes	9 0 0	11 10 0
Second "	8 10 0	9 0 0
Third "	8 0 0	8 10 0
Fourth "	7 10 0	8 0 0
Oddments and battens at 20s., 10s., 7s. 6d., and 5s. less respectively.		

* The prices named are for the wood as imported and landed in the docks. Ten per cent., approximately, should be added in order to arrive at the current trade prices.

PRICES CURRENT—*continued.*

	£ s. d.	£ s. d.
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Prepared Boards, per square		
1¼ by 6½ and 7 in. 1st yellow	10 0	15 0
" " and "	9 0	11 0
1 by 6½ and 7 in. 1st "	9 6	11 0
" " " white	7 6	9 6
" " and yellow	7 6	9 6
" " " white	6 0	7 6
¾ by 6½ & 7 in. 1st & 2nd yellow	7 6	8 6
" " " white	7 0	8 0
¾ by 6½ and 7 in. 1st yellow and white (grooved, tongued, and beaded)	7 6	8 0
¾ by 6½ and 7 in. 2nd yellow and white (ditto)	7 0	7 6
¾ by 6½ and 7 in. 1st yellow and white (ditto)	5 6	6 6
¾ by 6½ and 7 in. 2nd yellow and white (ditto)	4 6	5 6
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3rd quality at 15 per cent. less than 2nd.		
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Good middling and Second	3 5 0	3 10 0
Common middling	3 0 0	3 5 0
Undersized	3 0 0	3 5 0
Swedish and Norwegian Balks	2 10 0	2 15 0
Baltic Oak Timber—		
Danzig and Stettin—Large	3 5 0	4 5 0
Small	2 10 0	3 5 0
Quebec Timber per load		
Yellow Pine	5 5 0	7 0 0
Oak	4 10 0	6 10 0
Elm	5 0 0	5 10 0
Ash	4 5 0	5 0 0
Birch	2 15 0	4 15 0
New Brunswick, &c., Birch	2 10 0	3 0 0
American Pitch Pine Timber	3 17 6	4 10 0
Wainscot, per log, 18 cubic ft.—		
Crown (Eng. & Dutch) } nominal	4 5 0	5 15 0
Brack }	3 10 0	4 10 0
Lathwood, per cubic fathom—		
Petersburg	4 0 0	6 10 0
Riga and Danzig	4 10 0	5 10 0
Norway Poles, per ft. run	0 0 1	0 0 1½
Oak Staves, per mille full size pipe		
Memel, Crown	210 0 0	220 0 0
Brack	180 0 0	190 0 0
Danzig	165 0 0	175 0 0
Bosnia, single Barrel (nominal)	98 0 0	30 0 0
United States, Pipe	35 0 0	42 10 0
Hogshead, extra heavy and double extra	27 10 0	32 10 0
Indian Teake per load	11 0 0	16 10 0
British Guiana Greenheart	0 0 0	8 0 0
Mahogany, per foot superficial—		
Honduras, cargo average	0 0 5	0 0 6½
Nicaragua, do.	0 0 4½	0 0 5½
Tabasco, do.	0 0 4½	0 0 6½
Mexican, do.	0 0 4	0 0 4½
Panama, do.	0 0 3	0 0 4
African, do.	0 0 3½	0 0 5½
Cuba, do.	0 0 0	0 0 8
St. Domingo, do.	0 0 5	0 0 7½
Do. Curls (good to prime)	0 0 9	0 1 3
Walnut, American (logs)	0 2 3	0 4 6
Do. do. (planks and boards)	0 2 0	0 7 6
Italian, per foot superficial	0 0 3	0 0 7½
Black Sea, per ton	6 0 0	12 0 0
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Bar, Welsh, in London	9 0 0	9 15 0
Do. do. at works in Wales	8 10 0	9 0 0
Do. Staffordshire, in London	9 15 0	11 15 0
Copper—British cake and ingot	78 5 0	79 5 0
Best selected	79 15 0	81 0 0
Sheets, strong	83 0 0	85 0 0
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Spanish ton	17 15 0	0 0 0
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Pipe	19 15 0	0 0 0
Zinc—English sheet ton	26 0 0	0 0 0
Vieille Montagne	27 0 0	0 0 0
Spelter	20 10 0	20 15 0
Tin—Straits	125 0 0	0 0 0
Australian	125 5 0	125 15 0
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Banca	0 0 0	0 0 0
Billiton	0 0 0	0 0 0

OILS.

Linseed ton	21 17 6	22 0 0
Cocoanut, Cochin	29 15 0	0 0 0
Do. Ceylon	25 15 0	0 0 0
Palm, Lagos	27 10 0	0 0 0
Rapeseed, English, pale	24 0 0	0 0 0
Do. Brown	22 10 0	0 0 0
Cottonseed ref.	19 0 0	20 0 0
Oleine	17 5 0	19 5 0
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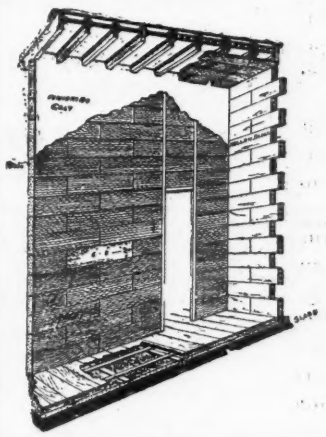

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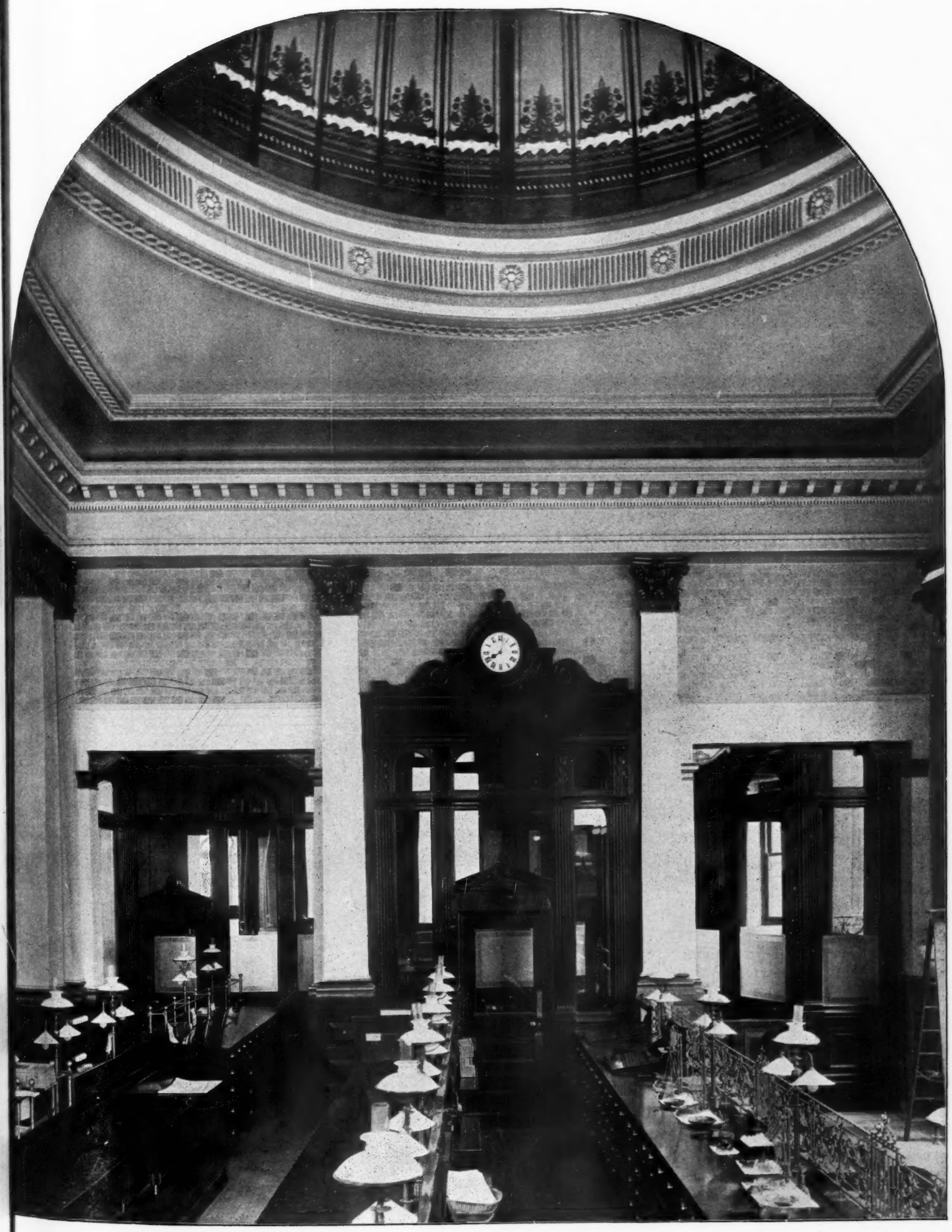

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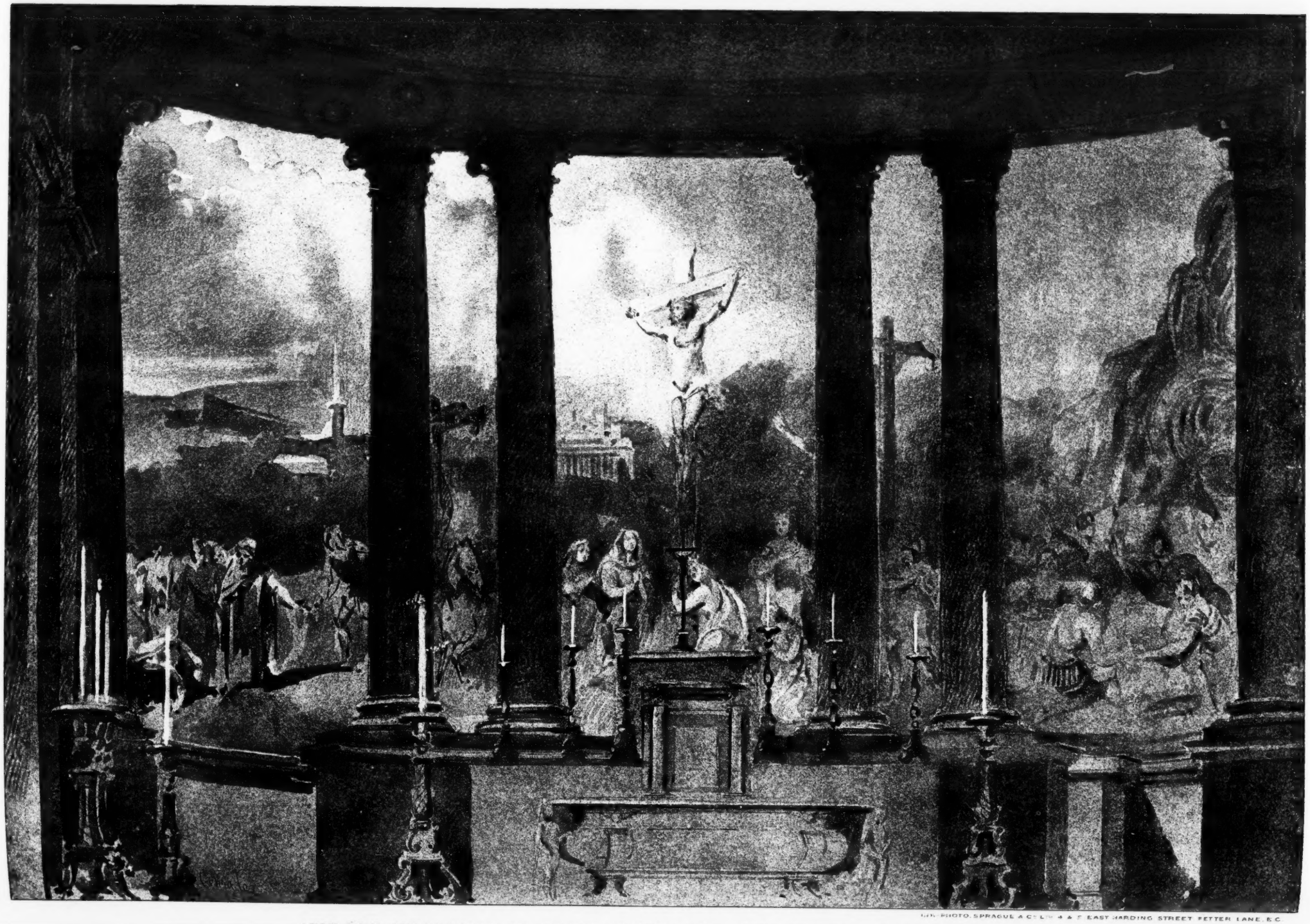

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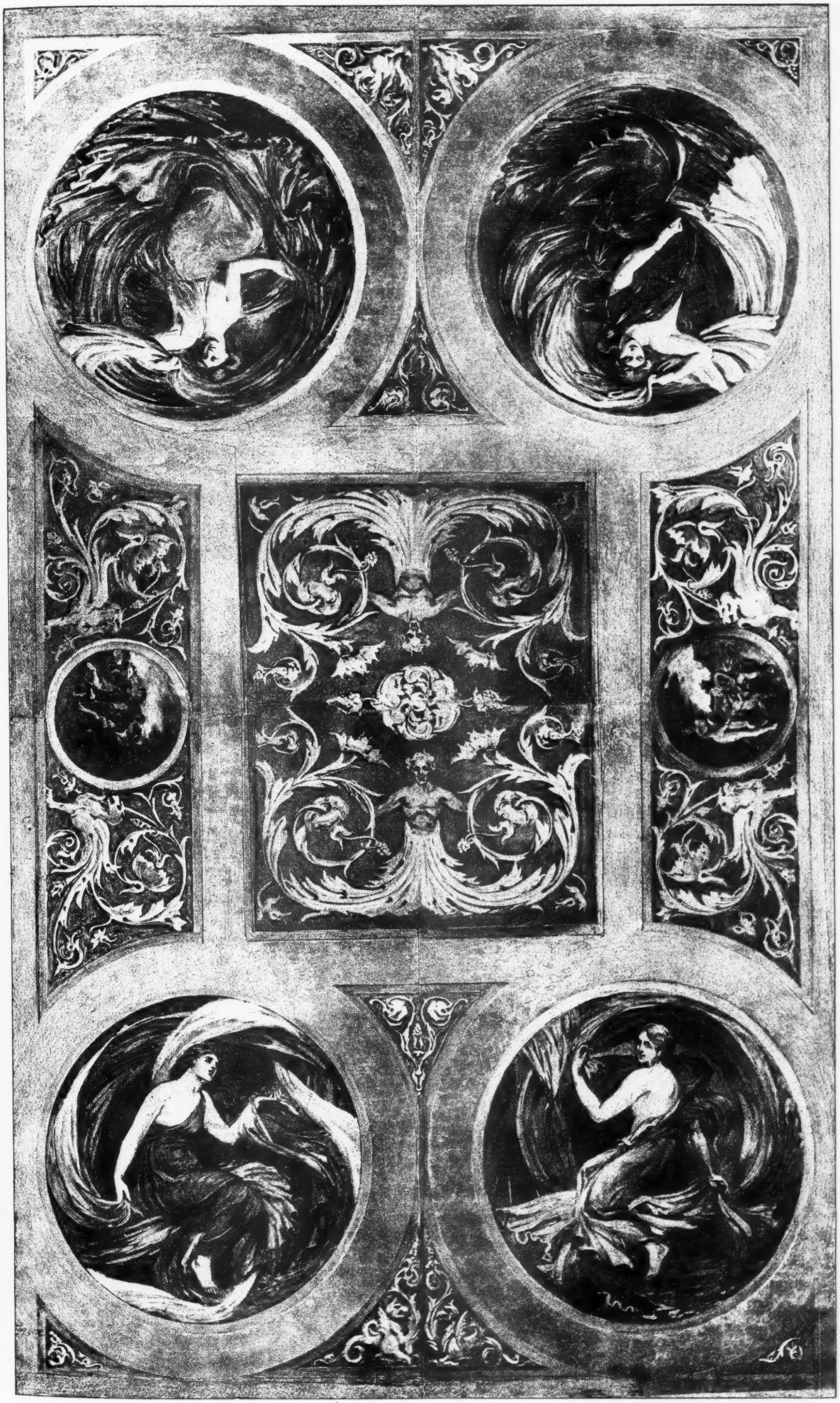

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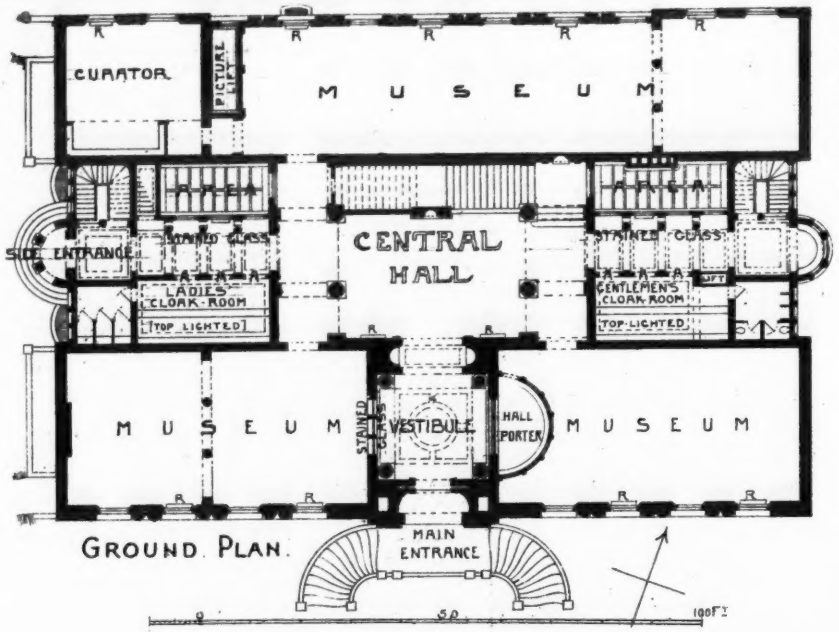
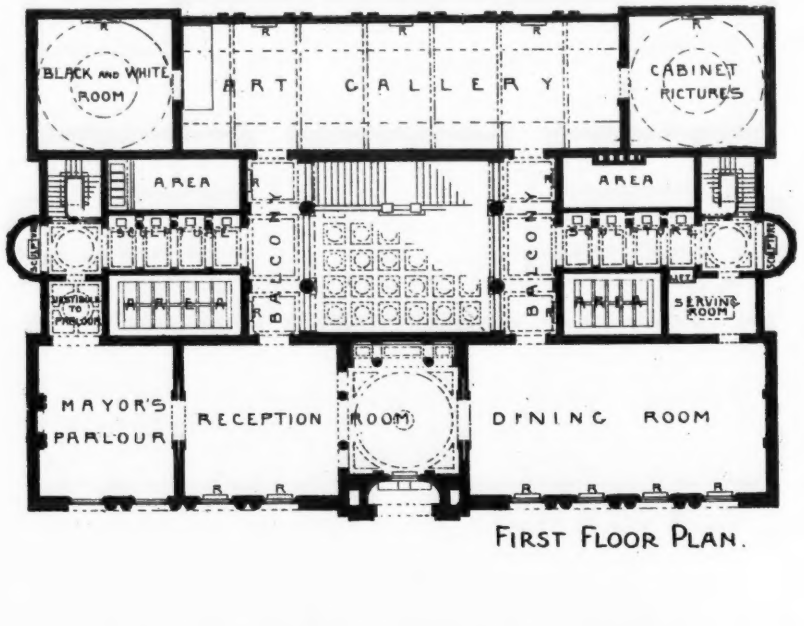


GROUND PLAN.

THE CLOAKROOMS SHOWN ON GROUND PLAN ARE FOR USE ONLY ON OCCASION OF RECEPTIONS, WHEN THE BUILDING WOULD BE CLOSED TO THE PUBLIC. [SEE DESCRIPTION.]



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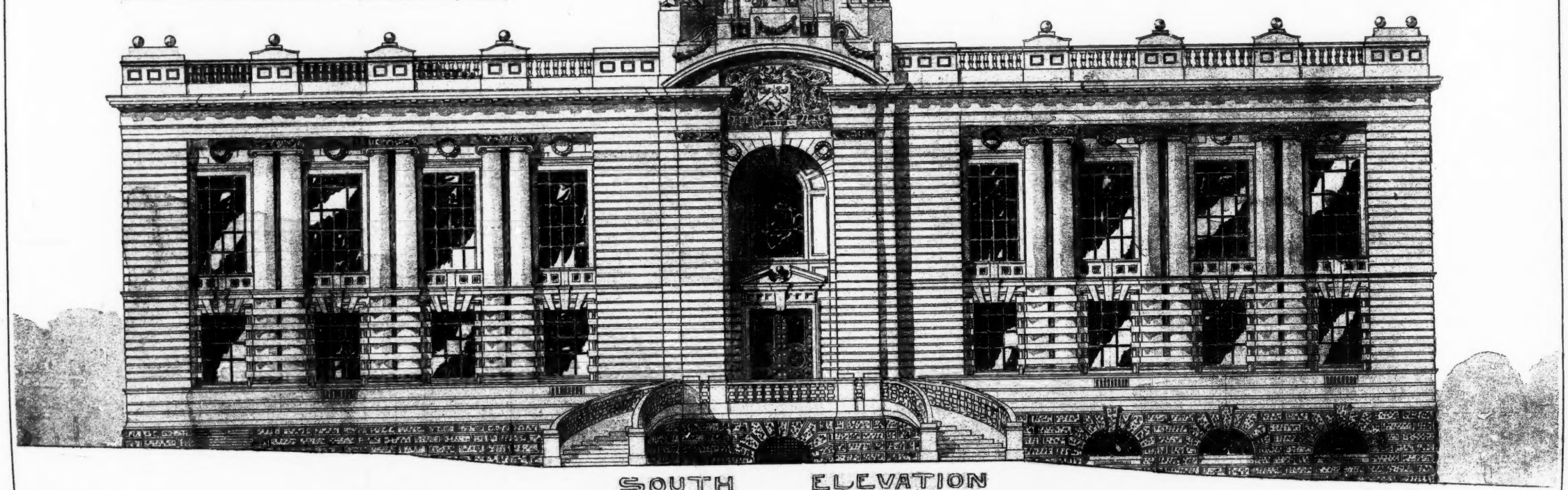
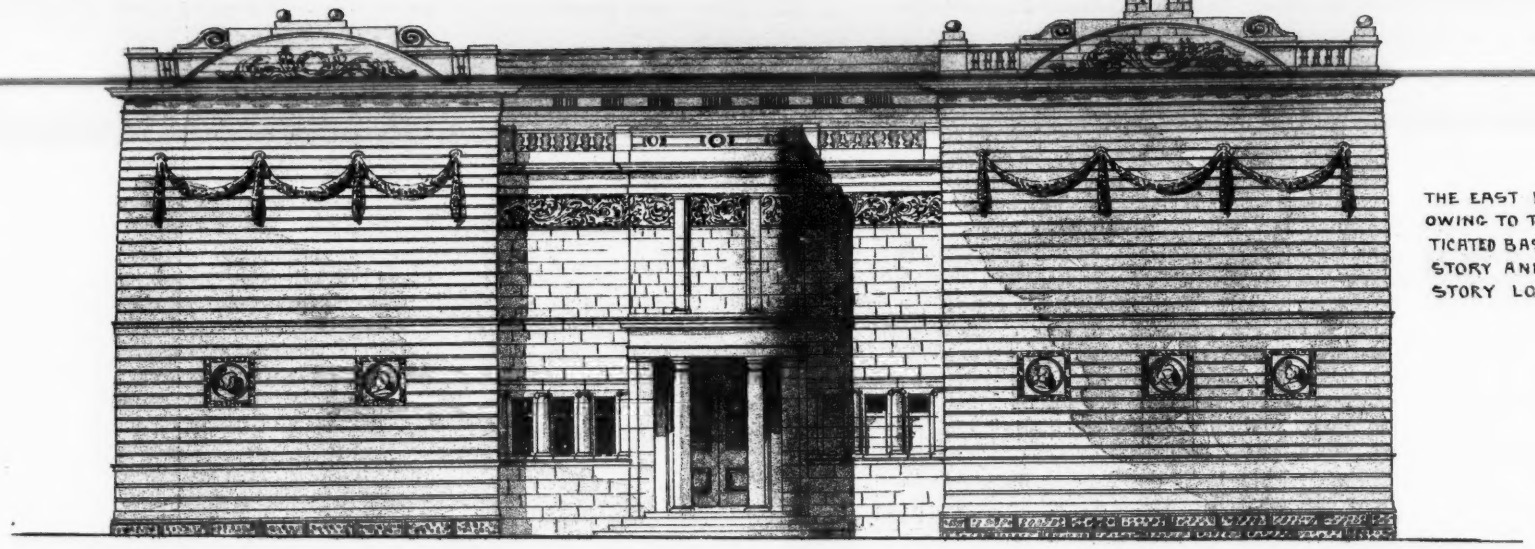


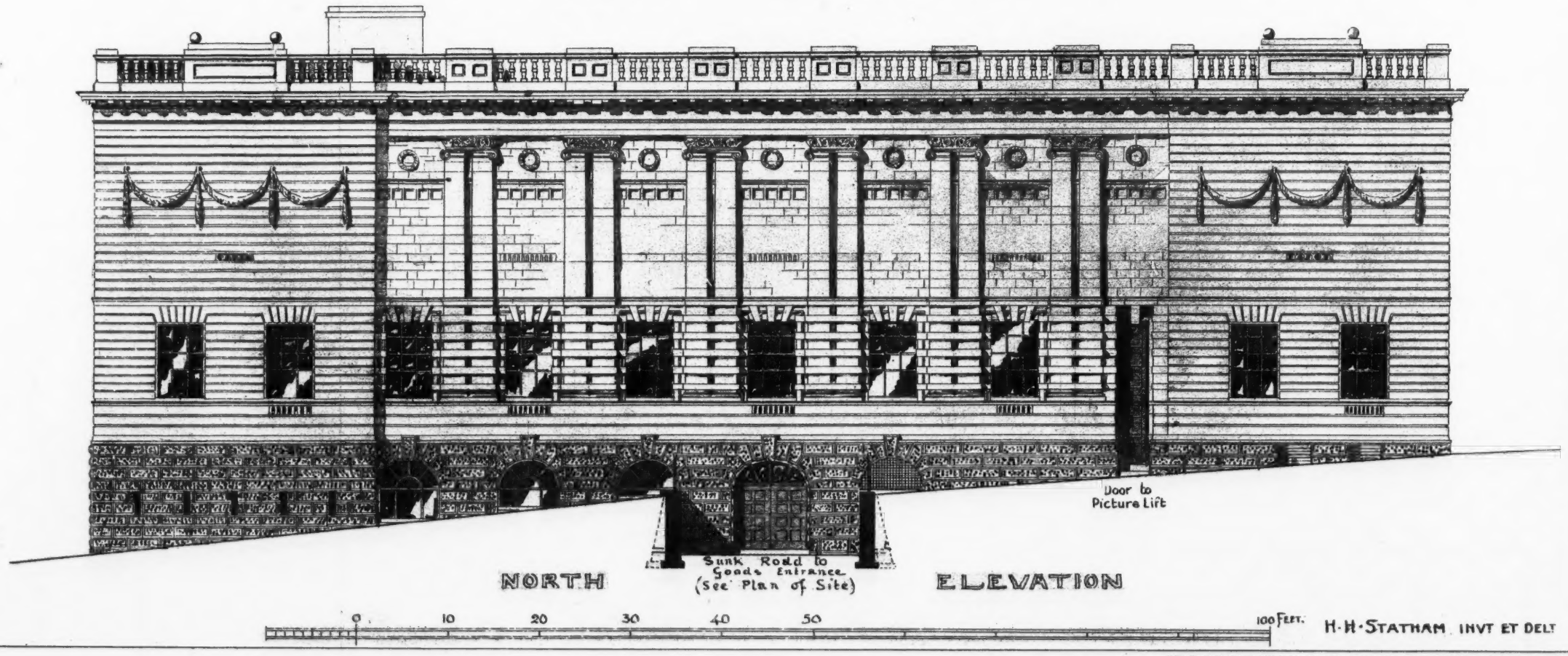
SOUTH ELEVATION

EAST ELEVATION



THE EAST ELEVATION WILL BE SIMILAR-EXCEPT OWING TO THE FALL OF THE GROUND THE RUSTICATED BASEMENT WILL FORM AN ADDITIONAL STORY AND THE ENTRANCE WILL BE A STORY LOWER.

WEST ELEVATION.



NORTH ELEVATION

0 10 20 30 40 50 100 FEET.

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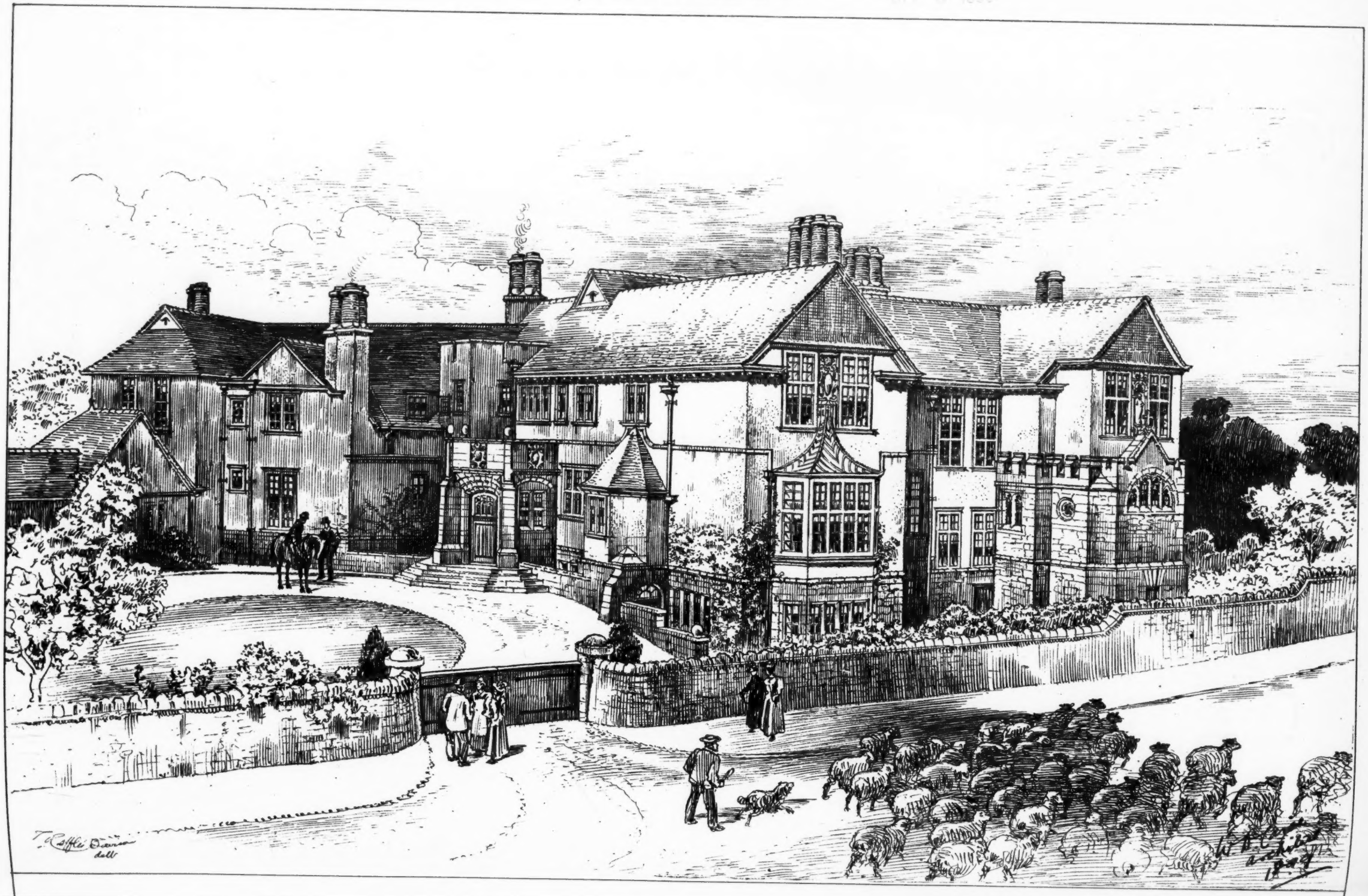

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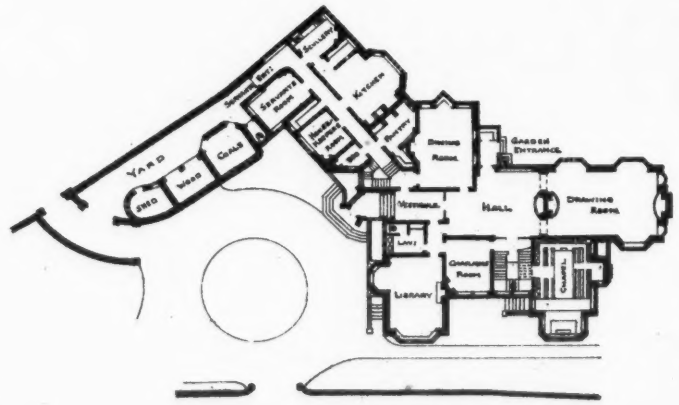

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